Introduction to Seismic Data Loading and Management in the Landmark® Environment

Volume 3

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Introduction to Seismic Data Loading and Management in the Landmark Environment: Volume 3

Chapter **6**

Seismic Data Manager

Course Overview

Topics covered in this class include:

- Seismic Data Manager Introduction
- Seismic Data Manager Window
- Tools in Seismic Data Manager

This chapter focuses options and tools available in Seismic Data Manager for tasks that are occasionally required when managing seismic and horizon data. These tasks include viewing, editing, cataloging, and deleting seismic files and managing horizon data.

Introduction to Seismic Data Manager

Seismic Data Manager is a tool for all seismic data management tasks including managing navigation data (from seismic surveys), seismic data volumes (PostStack and Pre-Stack) and horizon data.

Seismic Data Manager is an OpenWorks utility that allows you to manage and/or create:

- 3D surveys
- 2D and 3D seismic data (including prestack data)
- 2D surveys
- Horizon data (including prestack horizons)
- Horizon selection in an interpretation project
- Locations of seismic data
- Processing history

Seismic Data Manager also has tools to:

- Check data
- Import
- Export

Some components of 2D and 3D data are necessary for Landmark software applications to work, and it is a good idea to keep these components in mind when loading and managing seismic data.

Components of 2D Data

In OpenWorks software, 2D data requires the following minimum information:

- Survey name
- Unique line name
- Common line name (may be the same as the unique name)
- Shotpoint x,y locations
- Minimum and maximum trace numbers
- Shotpoint-to-trace ratio

In 2D surveys, multiple seismic traces may be grouped to the same shotpoint location. Since both traces and shotpoints have a different numbering system, a relationship must be established between these two major components, to enable the seismic traces to be displayed at the proper shotpoint location.

Before 2D seismic data can be displayed, you must load:

- seismic trace data
- navigation (shotpoint location) data

2D seismic trace data can be loaded with PostStack or SEGY Import. The navigation data, usually in ASCII files, is loaded with Data Import Tool. In the absence of ASCII files, the navigation data may be extracted from the SEG-Y headers (see Chapter 5 for PostStack workflows). The navigation data may also be manually entered in Seismic Data Manager.

Components of 3D Data

In OpenWorks software, 3D data requires the following minimum information:

- Survey name
- Grid corners, line and trace increments, and x-axis
- Navigation information (world coordinates) for the three grid corners

Before you can load seismic trace data, you need to know the x,y coordinates for three corners of the 3D survey, the line (inline) and trace (crossline) increments, the line and trace spacing, and the most appropriate coordinate reference system (CRS) for the data. This information is stored in an OpenWorks project database under a survey name within the framework of a master grid.

Seismic trace data loaders (such as PostStack Data Loader and SEGY Data Import) read the survey name and master grid from an OpenWorks project, and write the trace data to files in the directories where the seismic data is stored.

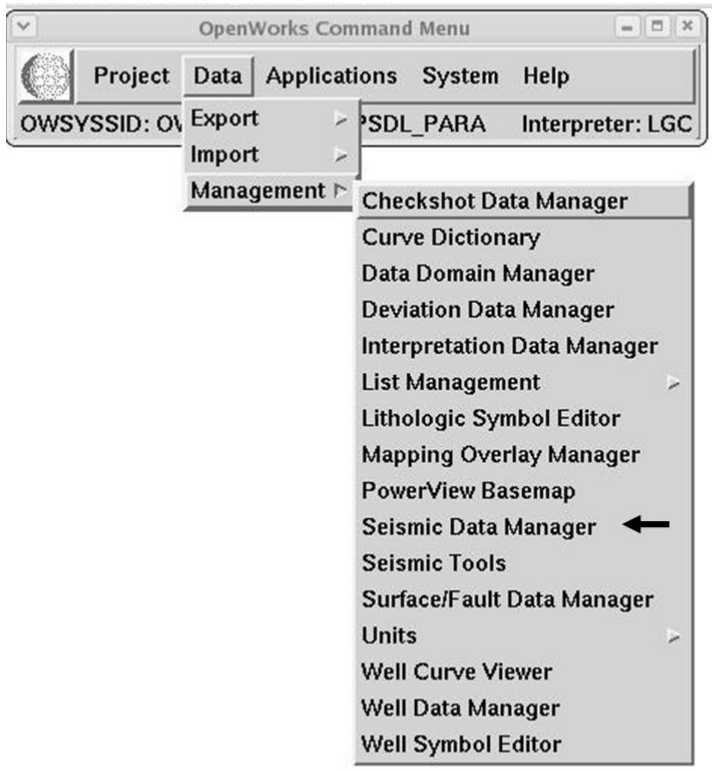
Importance of the 3D Master Grid

Setting a 3D master grid properly is a critical step in guaranteeing that your data will display correctly.

You may make changes to a grid until it has data associated with the grid; however, a grid has not been specified correctly, it is best to delete it, and start again. Once a grid is associated with data, you may change only the navigation values (x and y values).

Changing Navigation Values: If the navigation values are changed in a survey, horizon and seismic data will move with the survey. However, fault segments picked on the survey will not move with the survey.

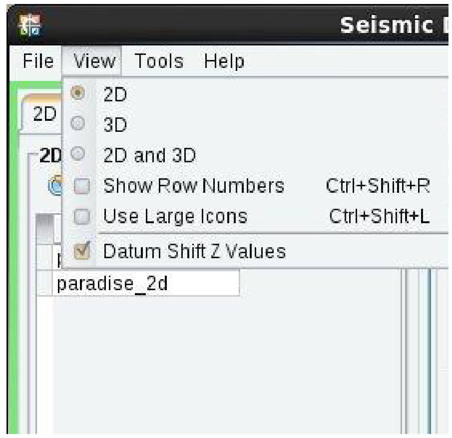
To launch Seismic Data Manager, select **Data > Management > Seismic Data Manager** from the OpenWorks command menu.

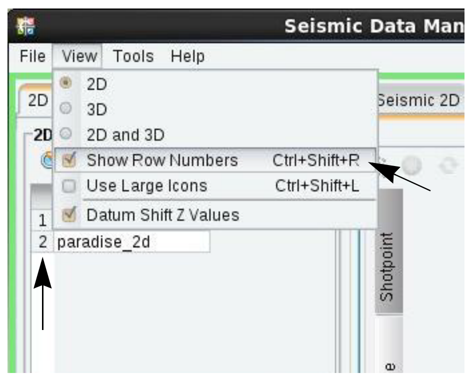


Seismic Data Manager opens and allows you to set the view and access the various loading and managing utilities.

Steps to set view options:

1. Select **View > 2D, 3D** or **2D and 3D** to select the data type(s) to manage.



> **Note**
>
> *Show Row Numbers* option lists the row number.
>
> 
>

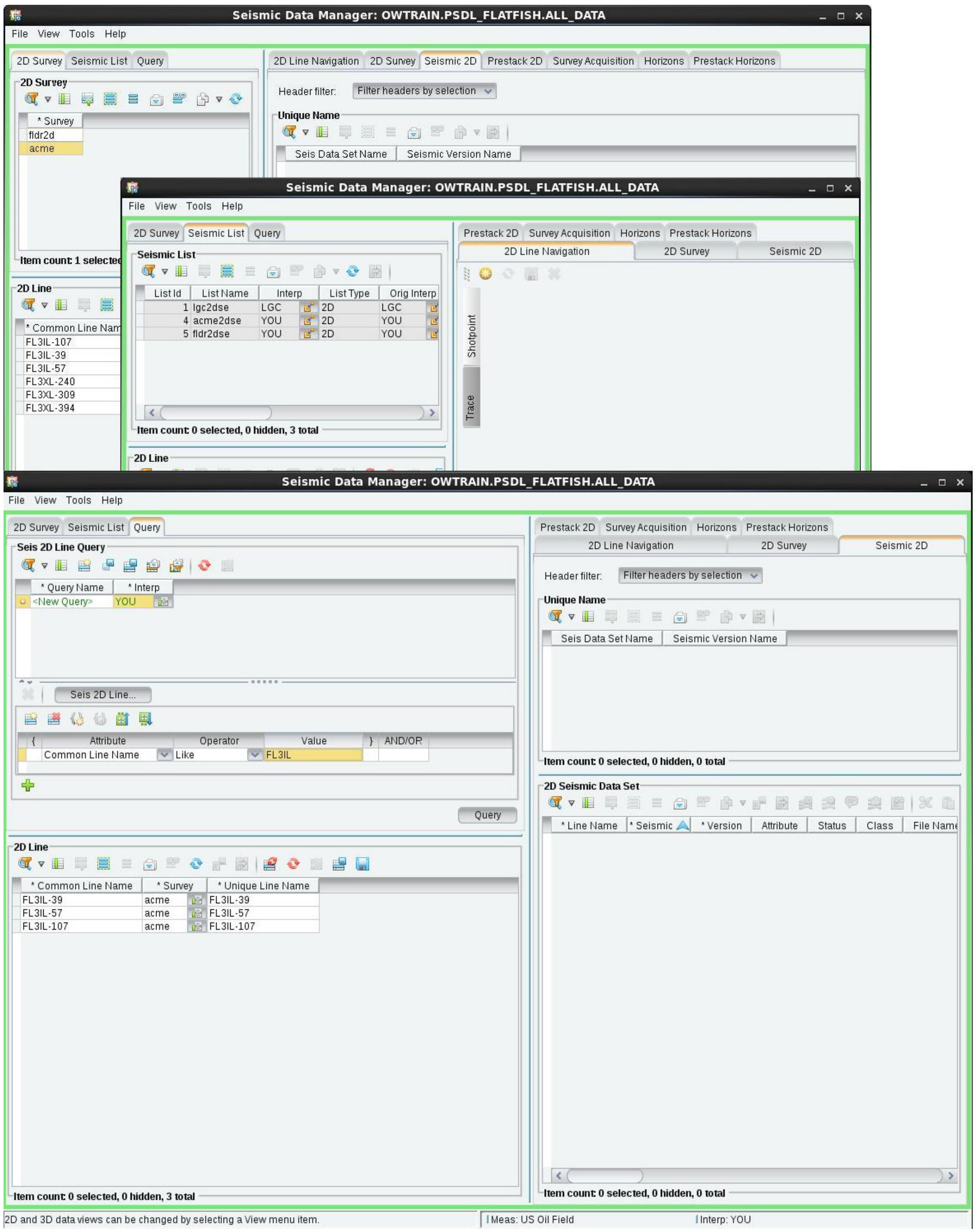
2. Select one or more surveys.

   The upper left pane the 2D Survey tables allow you to directly select the names of surveys.

> **Note**
>
> Only one survey selection is possible for the Survey Acquisition or 2D Survey tabs.

For 2D surveys, when managing data other than survey acquisition or survey information, first select the name of a survey in order to select 2D lines.

The left pane allows you to select lines by highlighting the names of lines directly, by selecting one or more line lists in the Seismic List tab, or to query the project for 2D lines with one or more properties in the Query tab.



If you are managing 2D data, select one or more 2D lines in the lower left pane.

3. Select tabs in the right pane to manage the seismic data in the project.

You can manage various types of 2D and 3D data:

2D Data: line navigation, survey information, seismic data, prestack seismic data, survey acquisition information, horizons, and prestack horizons

3D Data: survey navigation, seismic data, prestack seismic data, survey acquisition information, horizons, and prestack horizons

2D and 3D Data: (at the same time) survey acquisition information, horizons, and prestack horizons

Datum Shift Z Values option:

OpenWorks stores a datum elevation and a replacement velocity for each project (project databases and interpretation projects). The datum associated with a project is called the project datum.

OpenWorks also stores a storage datum and a working datum for some data types, such as 2D lines, 3D surveys, seismic data sets, horizons, faults, grids, mapping polygon sets, and contour sets. The storage datum is the datum under which the data was created. The working datum is the datum used when viewing the data in a data manager (such as Seismic Data Manager or Interpretation Data Manager) or some other application. If the working datum is not set, OpenWorks uses the project datum as the working datum.

These data types might also have Z values associated with the data. The Z values are calculated in relation to a datum. When stored in the database, the Z values are calculated in relation to the storage datum. When a difference exists between the project datum and the data's storage datum, and when the data is viewed in an application, the Z values for the data may appear inconsistent with the project datum. When viewing the data in an application, OpenWorks software calculates the Z values in relation to the data's working datum, automatically shifting the Z values of the data.

When OpenWorks automatically shifts a Z value relative to the working datum, only the view of the value is changed. The values stored in the database (the storage Z values) are not changed.

For viewing, Z values in the time domain are shifted according to the following formula:

CorrectionAmount = ((WorkingDatum - StorageDatum) / (ReplacementVelocity / 1000)) * 2

WorkingZValue = StorageZValue + CorrectionAmount

In the CorrectionAmount equation, the ReplacementVelocity is in units of feet/second (or meters/second). Since the Z values are in units of milliseconds, the divisor, 1000, converts the ReplacementVelocity to units of feet/milliseconds. The factor of 2 converts CorrectionAmount to a two-way time.

No Shifts: OpenWorks does not compute a shift if the replacement velocity is unset or zero.

For viewing, Z values in the depth domain are usually shifted relative to sea level, or may be shifted according to the following formula:

CorrectionAmount = WorkingDatum - StorageDatum

WorkingZValue = StorageZValue + CorrectionAmount

In applications like Seismic Data Manager and Interpretation Data Manager, you can turn off automatic shifting by un-checking the box of the *View > Datum Shift Z Values* option in the menu of the manager's window. To turn the function on again in the application, check the box.

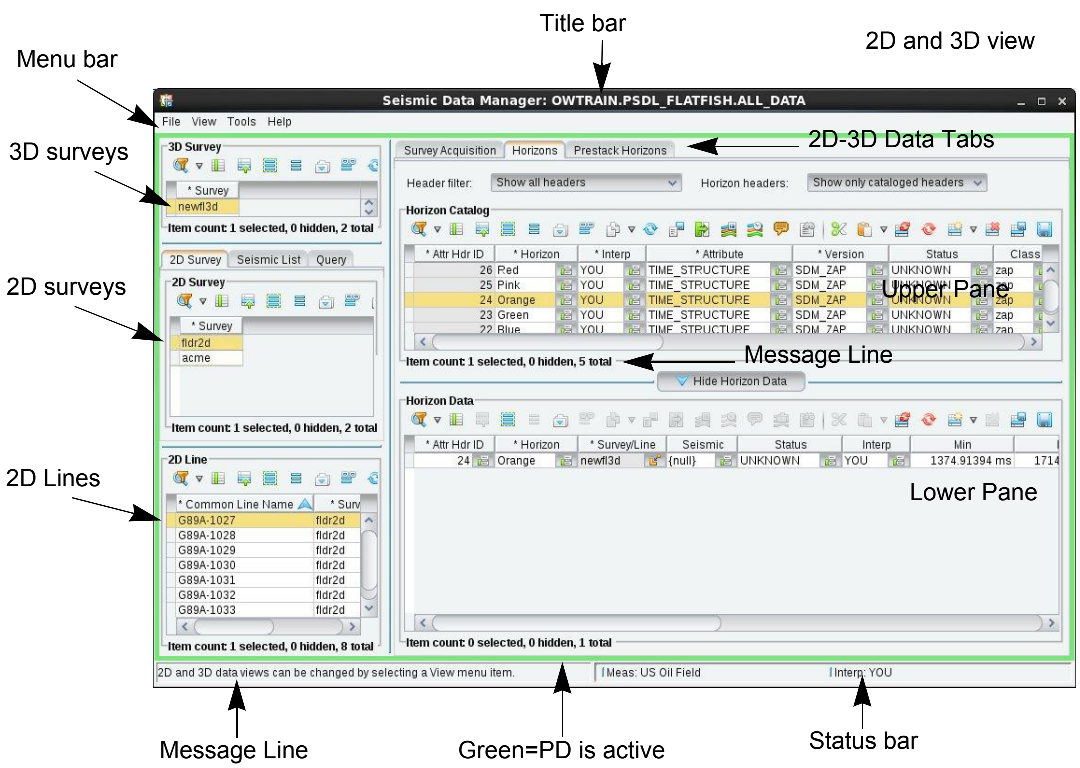
OpenWorks allows you to change the datum associated with data. Before changing a datum for data in a data manager (such as Seismic Data Manager or Interpretation Data Manager), turn off automatic shifting (uncheck the box of the *View > Datum Shift Z Values* option in the menu of the manager's window).

In addition to viewing and editing these types of seismic and seismic related data, Seismic Data Manager has various utilities available from the Tools menu for managing seismic and horizon data.

Seismic Data Manager Window

The window is composed of two main panes: a left pane, where tables of surveys and lines are listed, and a right pane, where information about the surveys and lines displays.

Window structure of Seismic Data Manager



Seismic Data Manager Panes:

Each of the panes may be further sub-divided into upper and lower panes.

Re-sizing panes

A pane divider allows you to resize the panes. The dividers can be moved so that only one pane displays in the window by moving the cursor over the divider and when an arrow displays, click MB1 and drag to the edge of the window. To see the hidden panes again, move the cursor to the edge over the divider until it highlights (usually yellow), click MB1 and drag into the widow. The width of a pane may sometimes obscure a toolbar; to see the full range, increase the size of the pane.

Right Pane

The right pane is where most of the management is accomplished in Seismic Data Manager. The tabs that appear in this pane depend upon which data type you have selected in the View menu.

2D:

2D Line Navigation, 2D Survey, Horizons, Prestack 2D, Prestack Horizons, Seismic 2D, and Survey Acquisition

3D:

3D Survey Navigation, Horizons, Prestack 3D, Prestack Horizons, Seismic 3D, and Survey Acquisition

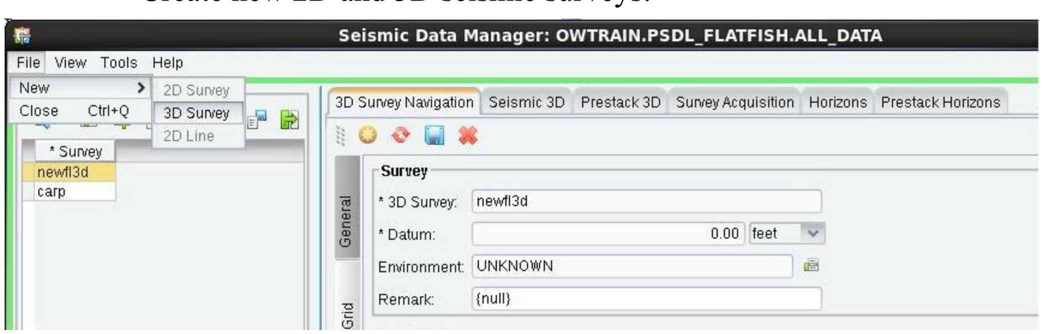
2D and 3D:

Horizons, Prestack Horizons, and Survey Acquisition

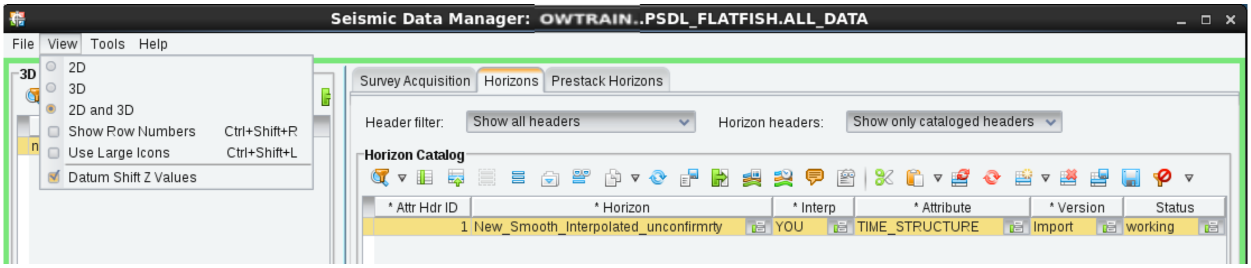
The main menu allows you to select various functional options.

Main menu drop down selection options:

Create new 2D and 3D seismic surveys:

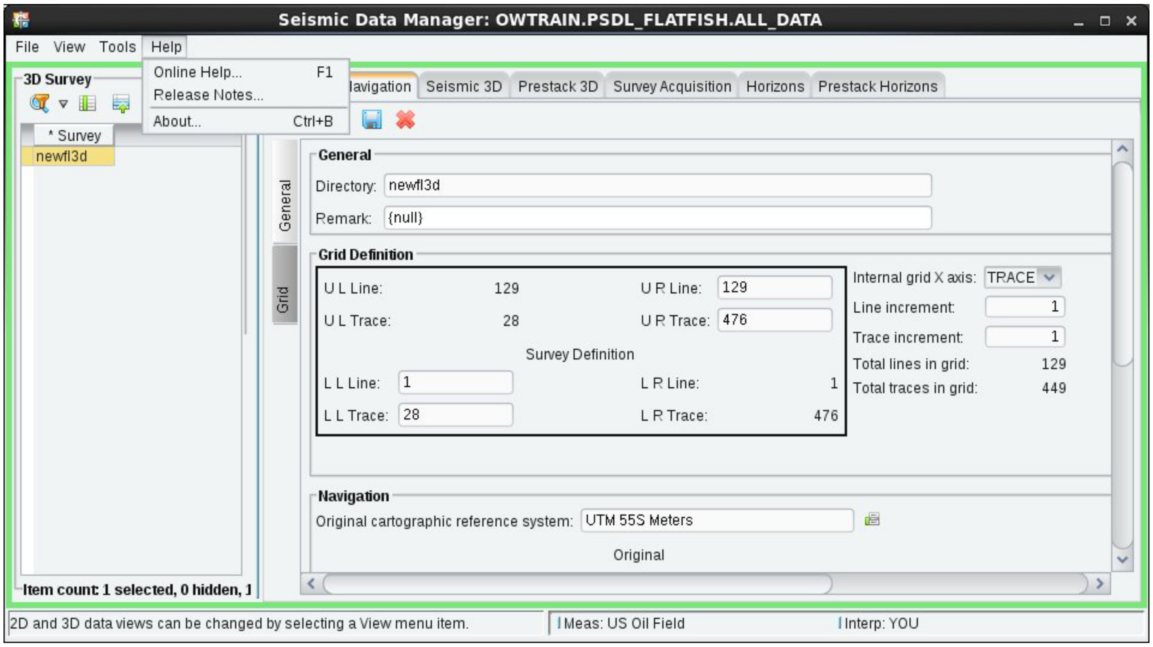


Set view type - 2D or 3D only or both:



Tools:

Help menu:



In the data loading portion of this class you have already used Seismic Data Manager to create 2D and 3D seismic surveys, check 2D navigation data loaded from ASCII files or from trace headers, create seismic storage directories, view seismic files and process history.

Seismic Data Manager has additional functionality such as managing horizon data and importing and exporting various types of data.

Seismic Data Manager Tabs:

3D Survey Tab

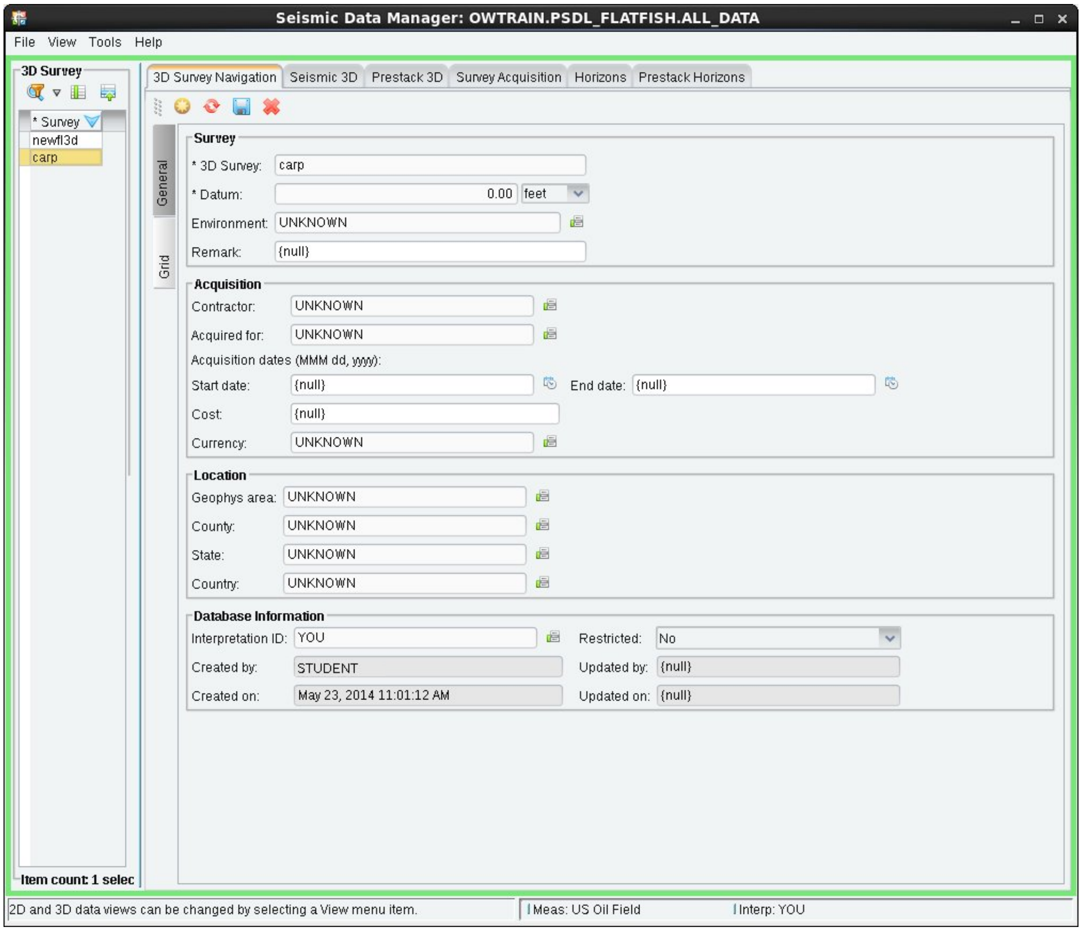
The 3D Survey tab in Seismic Data Manager allows you to create a new 3D survey ( ), supply input master grid coordinates for the survey and save ( ) or delete ( ) the survey.

Loading 3D survey information was covered in detail in Chapter 4, but listed here are the main components of the General and Grid subtabs:

The General subtab includes:

- Survey name (3D Survey, Datum, Environment, and Remark)
- Acquisition (Contractor, Acquired for, Acquisition Dates, Start Date, End Date, Cost, and Currency)
- Location (Geophys area, County, State, and Country)

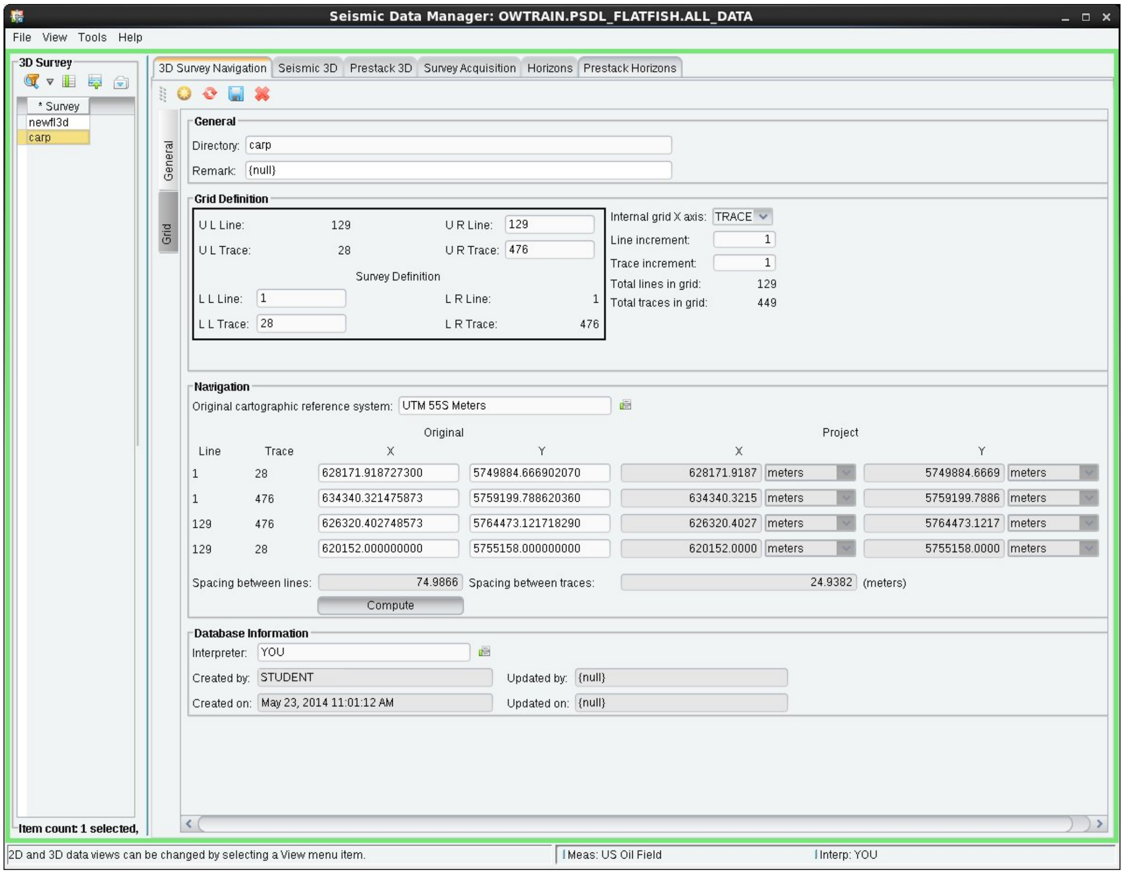
- Database Information (interpreter, restricted option, creation and update information)



The Grid subtab is divided into four sections:

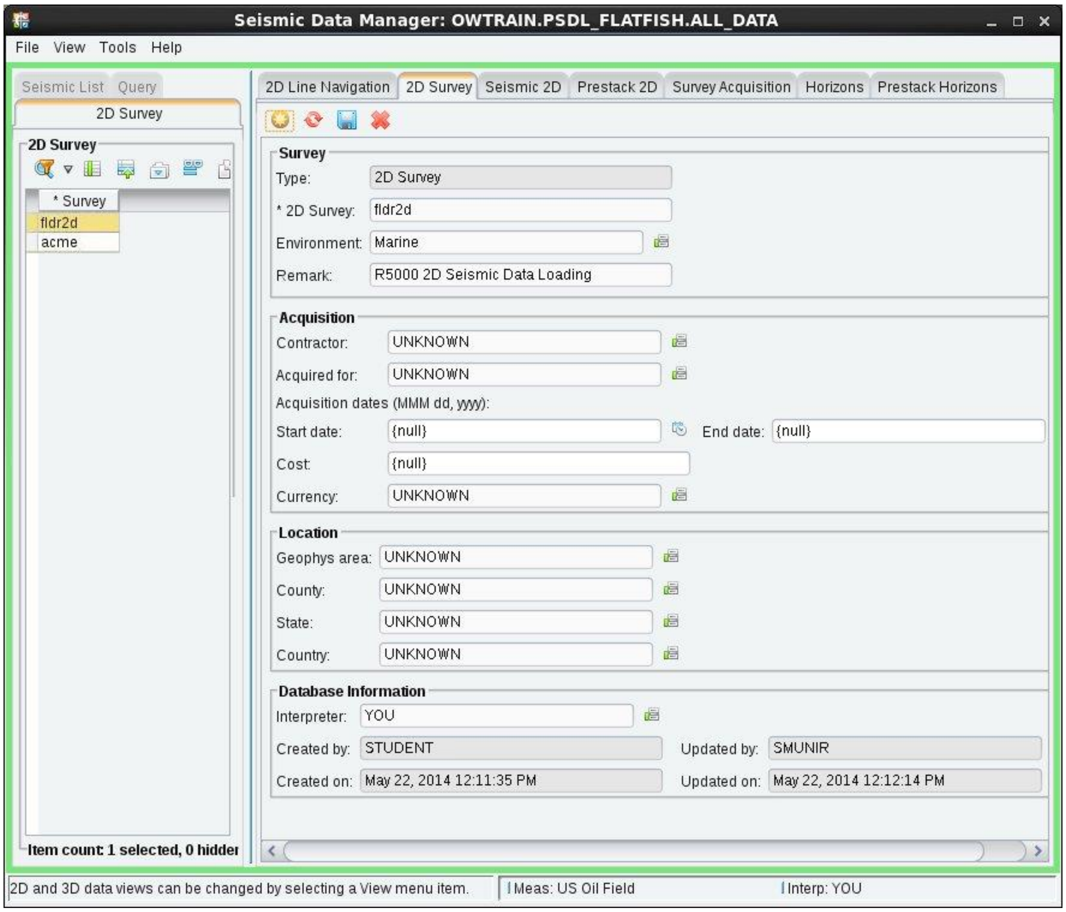
- General (directory and remark)
- Grid Definition (lower left and upper right corners and X Axis)
- Navigation (four corner coordinates of the survey and CRS that matches these coordinates)

- Database Information (interpreter, survey creation and update information)



2D Survey Tab

The 2D Survey tab in Seismic Data Manager allows you to create a new 2D survey ( ), supply basic survey information and save ( ) or delete ( ) the survey.



The types of information that may be entered are:

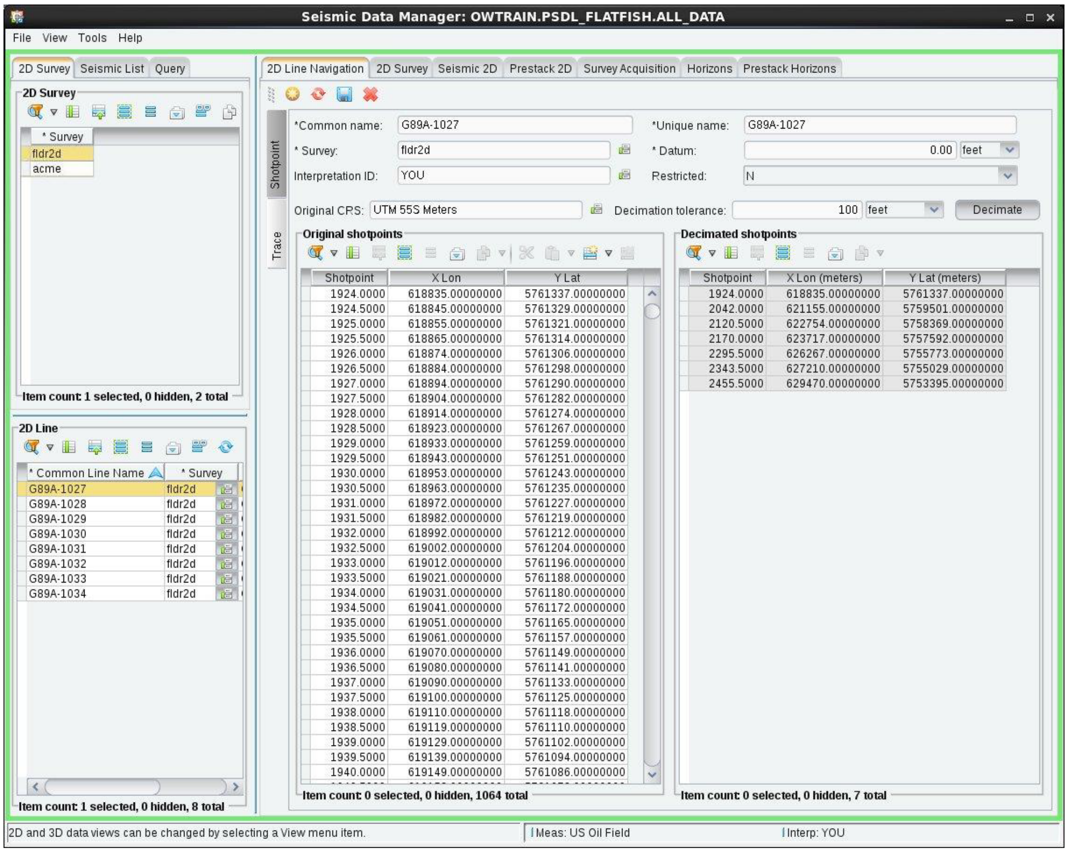
- Survey (3D Survey, Datum, Environment, and Remark)
- Acquisition (Contractor, Acquired for, Acquisition Dates, Start Date, End Date, Cost, and Currency)
- Location (Geophys area, County, State, and Country)
- Database Information (interpreter ID to be associated with the survey creation)

2D Line Navigation Tab

The 2D Line Navigation tab in Seismic Data Manager allows you to view, edit and enter shotpoint and trace navigation data associated with a 2D line. This tab is divided into Shotpoint and Trace subtabs.

Line lists may be created by using the **Export to Seismic List** icon ( ) in the 2D Line table. Lines lists are useful for data selection in applications and interpretation project creation.

Shotpoint subtab:



The types of information found are:

- Common 2D line name
- Survey association
- Unique 2D line name (often the same as the common line name)
- Interpreter ID (associated person responsible for loading the navigation data)
- Datum (seismic datum for the 2D line, editable for each line)
- Restriction classification (for sensitive data)
- CRS of the input navigation coordinates
- Decimation Tolerance
- Decimate option
- Shotpoint x,y coordinates

Decimate option:

At least two coordinate pairs are required to define a 2D line, but coordinates at each shotpoint location may be input. If there are many coordinates, decimation may be used to speed up display in the seismic views, but care must be taken to preserve the line location.

When decimating 2D lines, a decimation tolerance is specified (non-negative integer, where 0 is no decimation). The decimation tolerance is a linear distance that specifies the maximum distance any shotpoint coordinate can be from the decimated line.

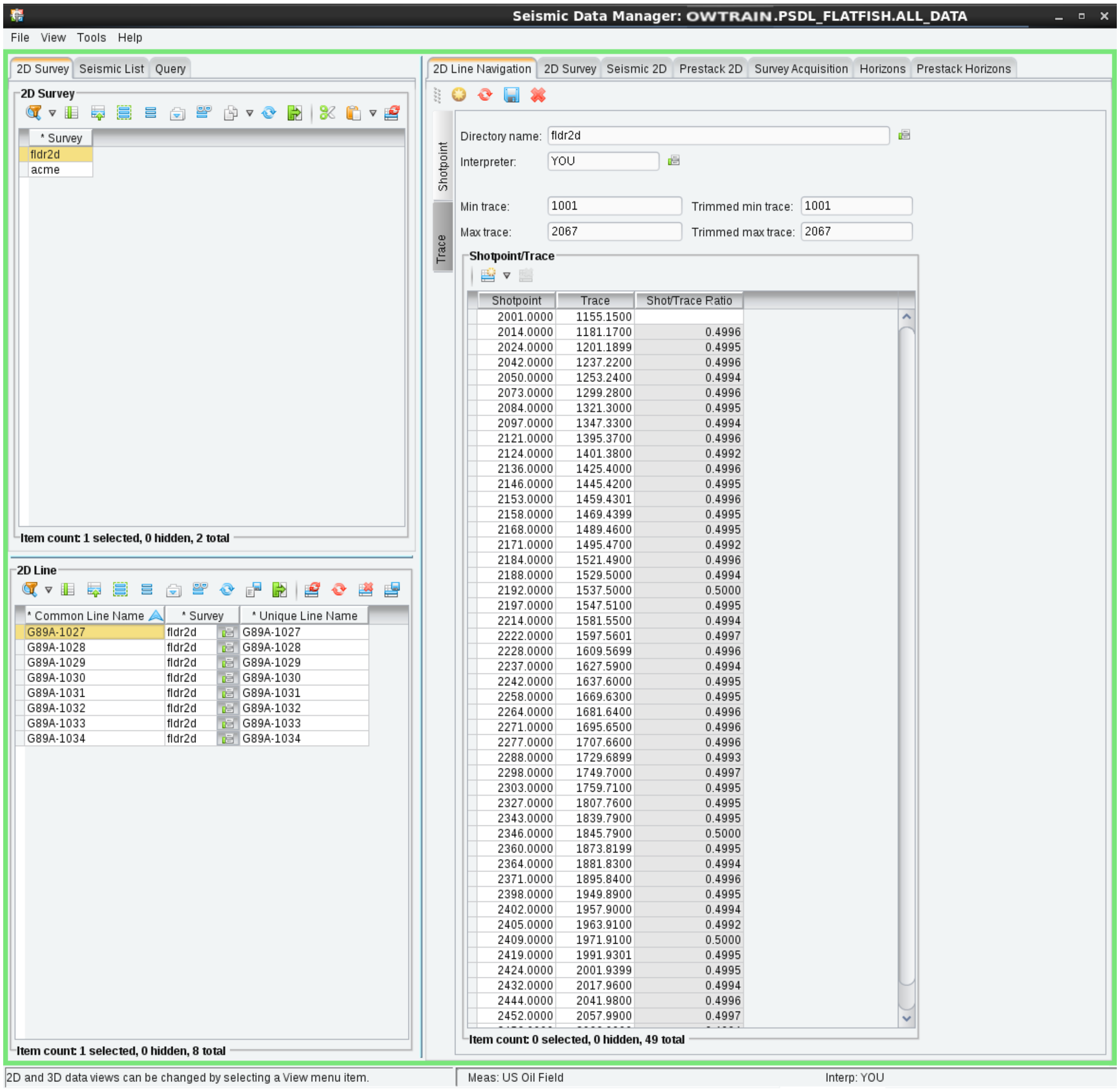
OpenWorks stores both the original shotpoints and the decimated data, so you can try various decimation factors by re-iteratively changing the decimation tolerance in Seismic Data Manager, and then displaying lines in SeisWorks or DecisionSpace Desktop to try to improve display time.

Common Line Name and Unique Line Name choice:

Some applications, such as PowerView and DecisionSpace Geosciences will let you choose whether to display Common or Unique line name.

OpenWorks requires that the common line name be unique for an interpretation project, and therefore it must be unique to the project database.

Trace subtab:

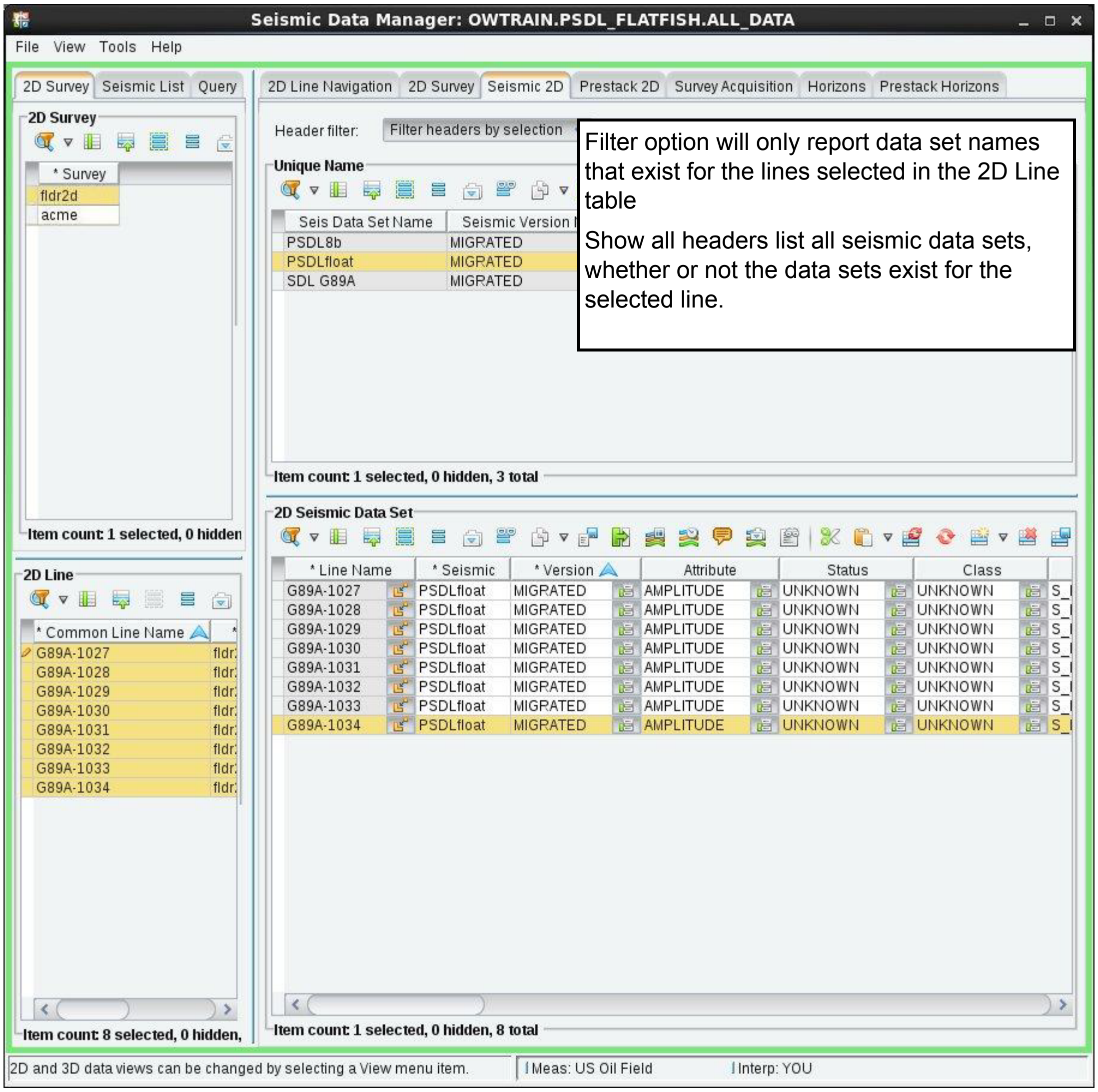


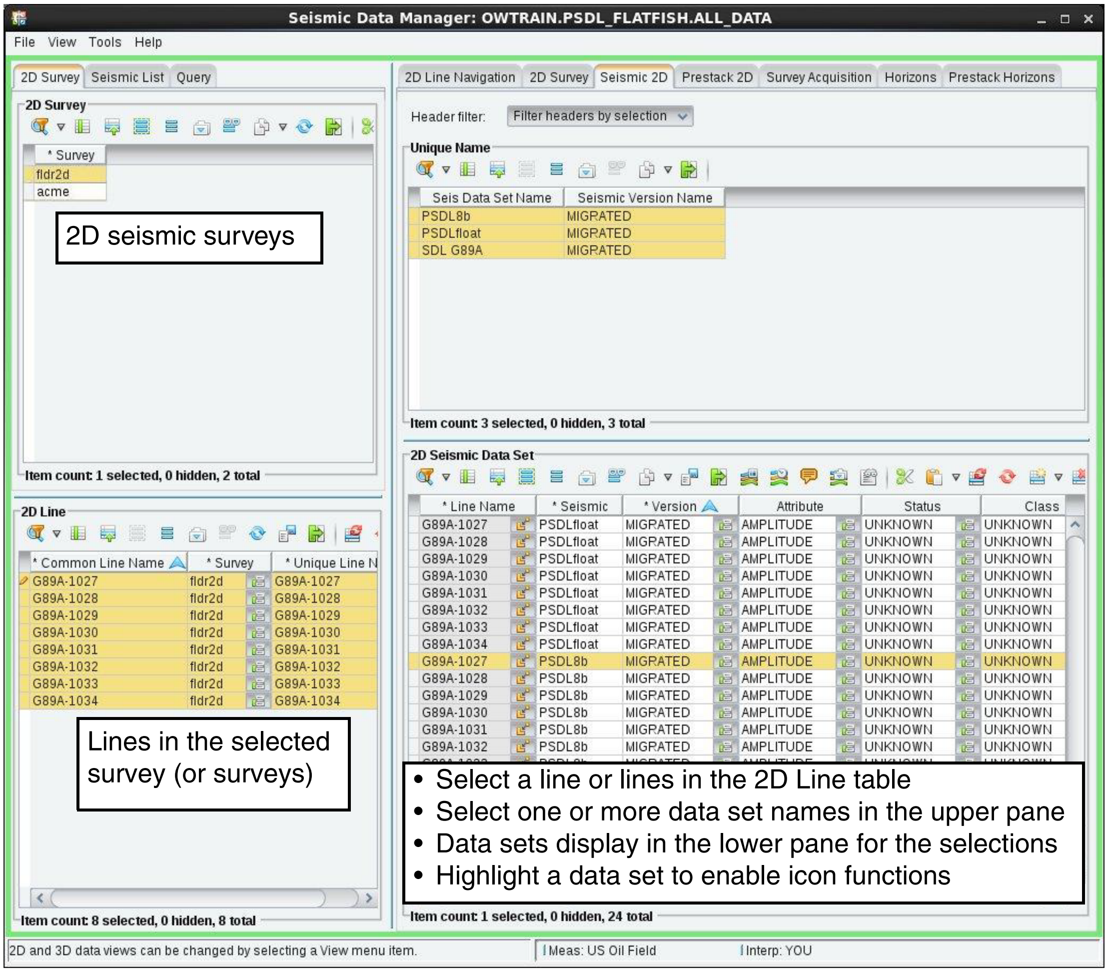
The types of information found are:

- Storage directory name associated with the 2D line
- Interpreter ID associated with the navigation information
- Minimum and maximum trace range
- Trimmed minimum and maximum trace range
- Shotpoint-to-trace ratio

2D Seismic Tab

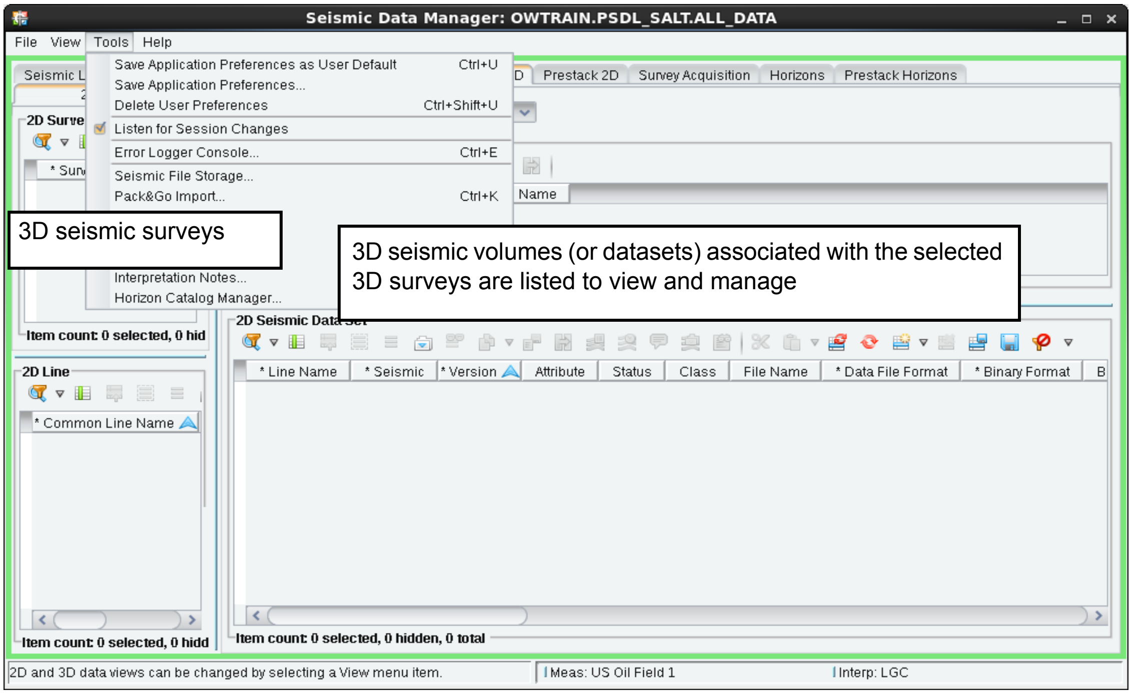
This tab in Seismic Data Manager allows you to manage 2D seismic data.



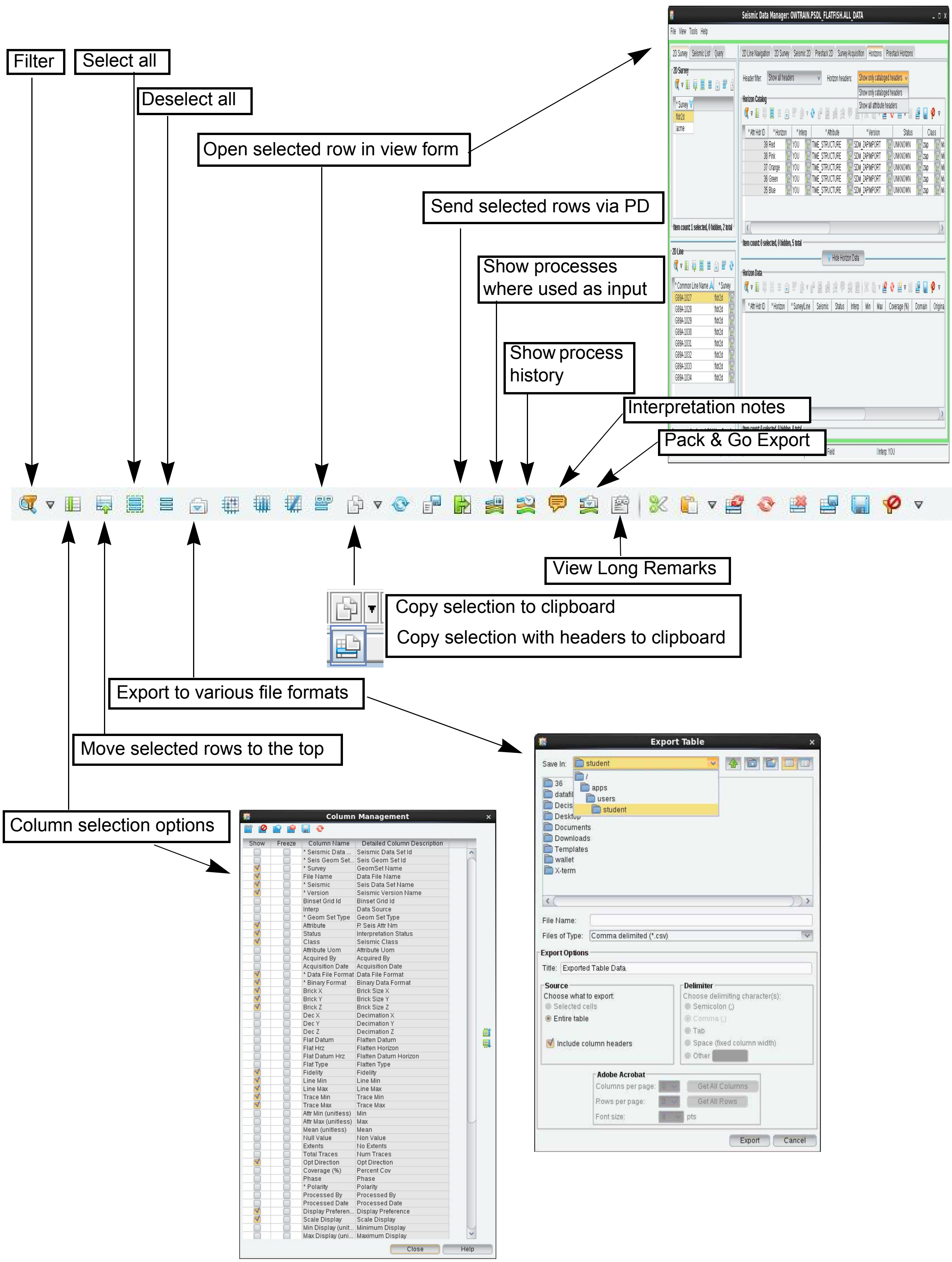

Seismic Data Manager: OWTRAIN.PSDL_FLATFISH.ALL_DATA
2D seismic surveys
Lines in the selected survey (or surveys)
• Select a line or lines in the 2D Line table
• Select one or more data set names in the upper pane
• Data sets display in the lower pane for the selections
• Highlight a data set to enable icon functions

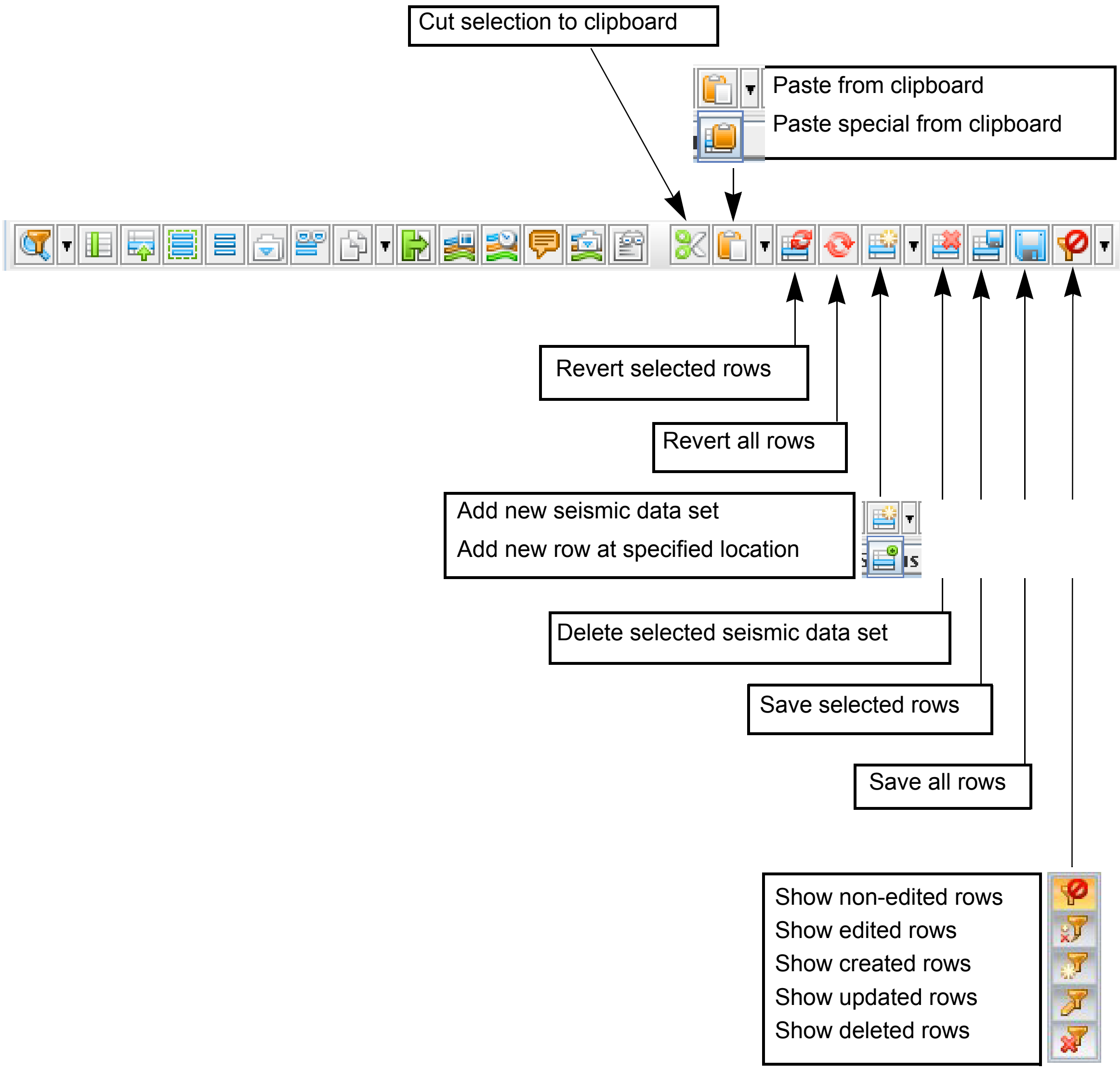
3D Seismic Tab

This tab in Seismic Data Manager allows you to manage 3D seismic data.



Once a dataset has been selected, appropriate icon functions are enabled. The icons are common to most of the data managers and perform similar functions depending on the type of data viewed in the manager.


Filter
Select all
Deselect all
Open selected row in view form
Send selected rows via PD
Show processes where used as input
Show process history
Interpretation notes
Pack & Go Export
View Long Remarks
Copy selection to clipboard
Copy selection with headers to clipboard
Export to various file formats
Move selected rows to the top
Column selection options
Export Table
Column Management



Survey Acquisition Tab

This tab in Seismic Data Manager allows you to record the acquisition geometry of the seismic data in a survey as well as record the facility information (seismic receiver, seismic source, seismic streamer, and seismograph) about the equipment to gather the data in the survey. Supplying this information is optional (not necessary for seismic interpretation).

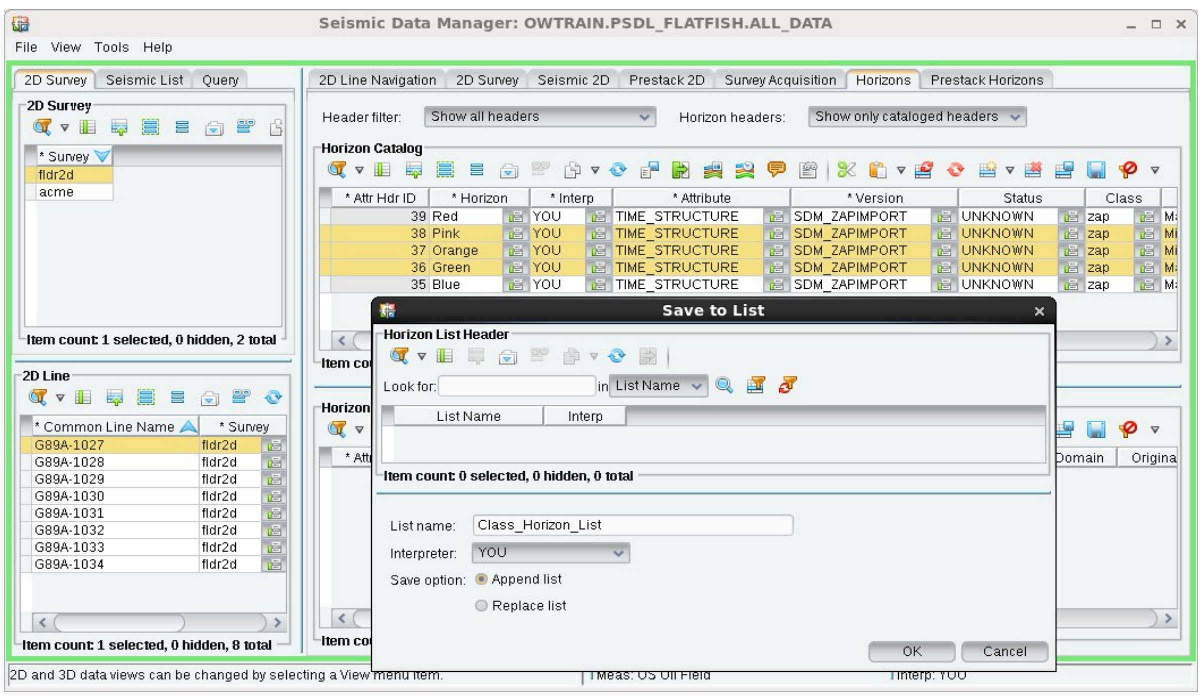
This tab describes the geometry associated with a seismic acquisition. A seismic acquisition may be composed of:

- a composition of lines in a 3D survey, 2D survey, or a line composed of segments
- a line composed of points in a 2D , source, or receiver line or the points in a vertical seismic profiling (VSP) or checkshot survey

Using the Survey Acquisition Tab

To view or edit survey acquisition information:

1. Select the *2D*, *3D*, or *2D and 3D* option in the View menu to select the type of survey to view.
2. Select the name of a survey in the left pane.
3. Select the Survey Acquisition tab.
4. In the Data Category drop-down list box, select the type of data to view or edit.



The types of data are:

- Nominal Seismic Geometry
- Seismic Receiver Facility
- Seismic Source Facility
- Seismic Streamer Facility
- Seismograph Facility

Horizons Tab

This tab allows you to display and manage horizon data.

There are two primary tables in the oracle database involved in the cataloguing and management of horizon data in an OpenWorks database project:

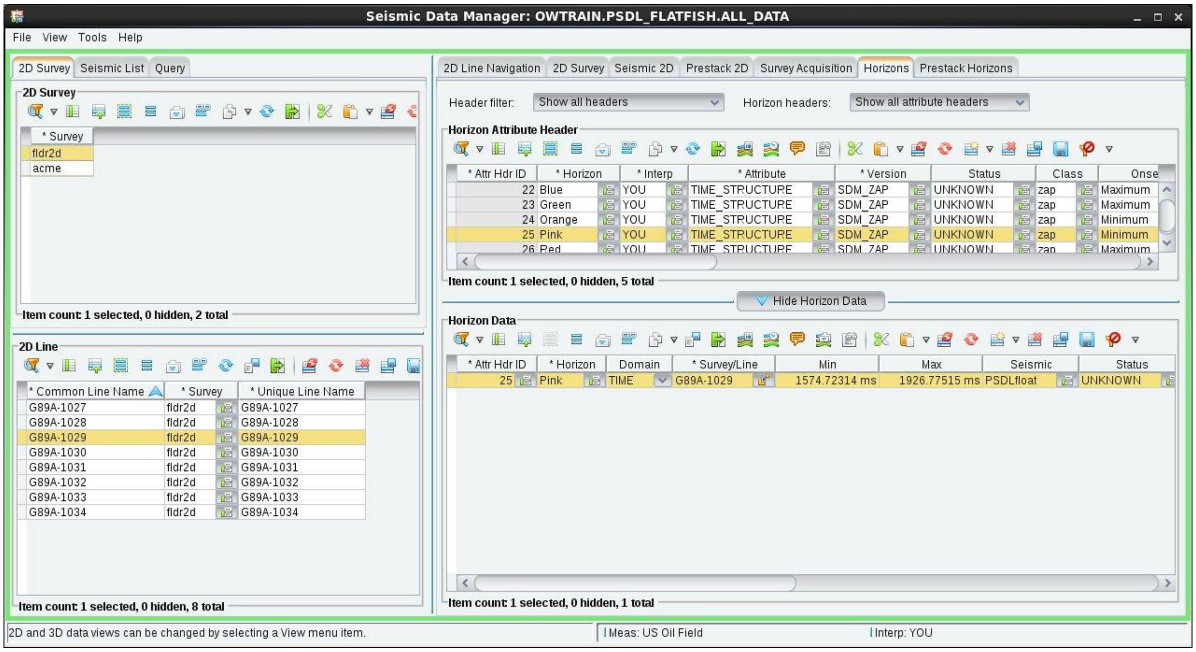
1. Horizon Catalog

2. Horizon Data

Horizon Catalog is the top level definition of a horizon. Each row in this table represents one horizon that can be defined in any number of 3D surveys or 2D lines in the OpenWorks project database.

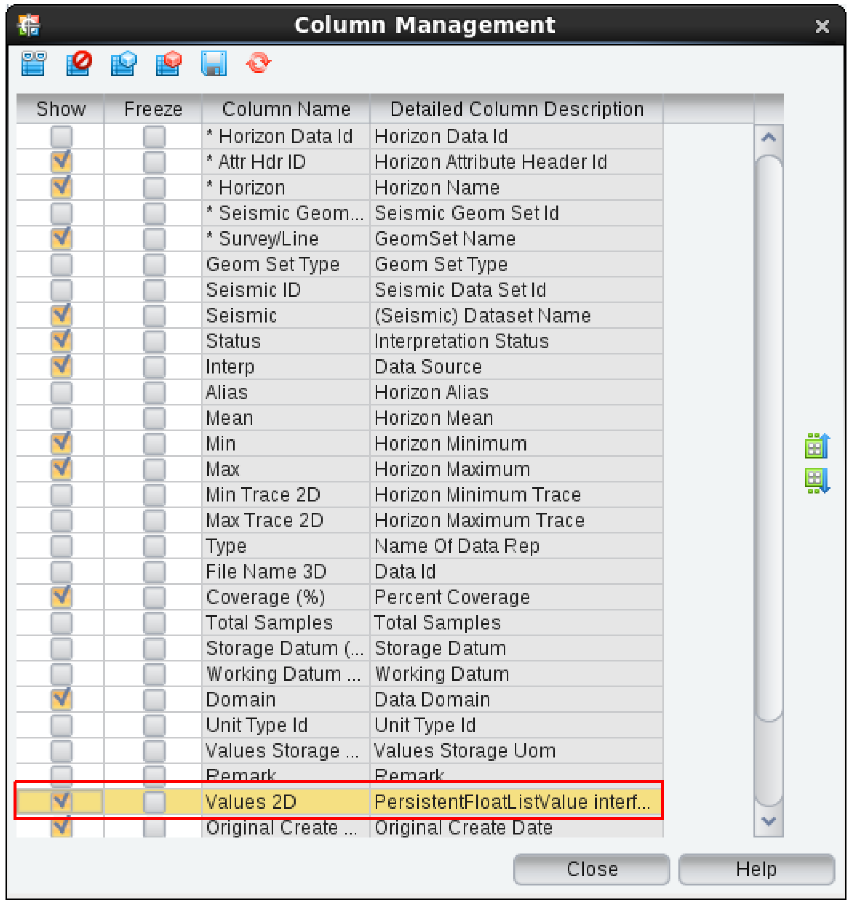
For each 2D line or 3D survey where a given *Horizon Catalog* is defined, a row in the *Horizon Data* table is created. For a horizon created in a 3D survey, this row contains the name of the external flat file containing the horizon data. For a horizon created on a 2D line, this row contains the horizon data defined for that line. There is no external flat file for 2D horizon data.

Each *Horizon Data* row is linked to both a single *Horizon Catalog* and a single 3D survey or 2D line.



2D horizons are stored in the database, and the horizon values can be viewed in Seismic Data Manager by selecting *Values 2D* in the *Column Management* dialog box, and then clicking the Values 2D button in Seismic Data Manager.

To open the *Column Management* dialog box, in the Horizon Data pane, click the Select Columns icon ( ). Toggle on the columns you want to see (in this case, Values 2D).



3D horizons are stored as files in directories determined from the dir.dat file and Seismic File Storage selections. To see the file name associated with a 3D horizon, open the *Column Management* dialog box and toggle *Filename 3D* to *Show*.

Note that column position may also be manually adjusted in the main window display by clicking and holding MB1 in the column, then moving the column to the desired position.

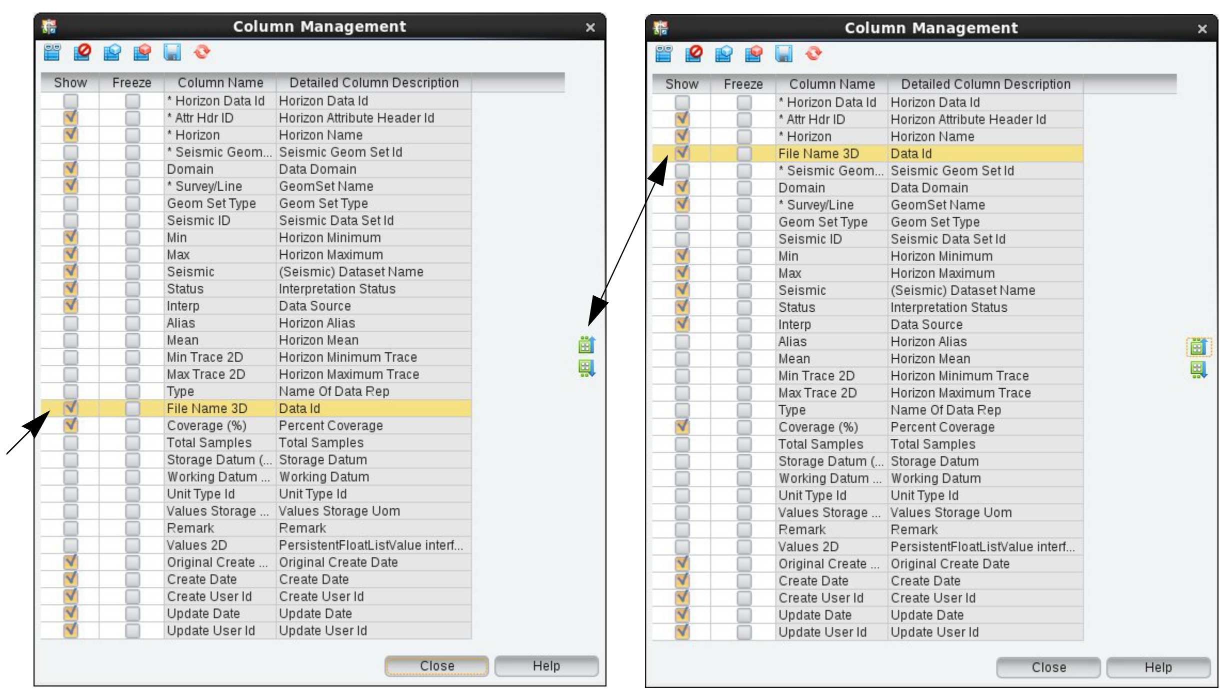
Column Management

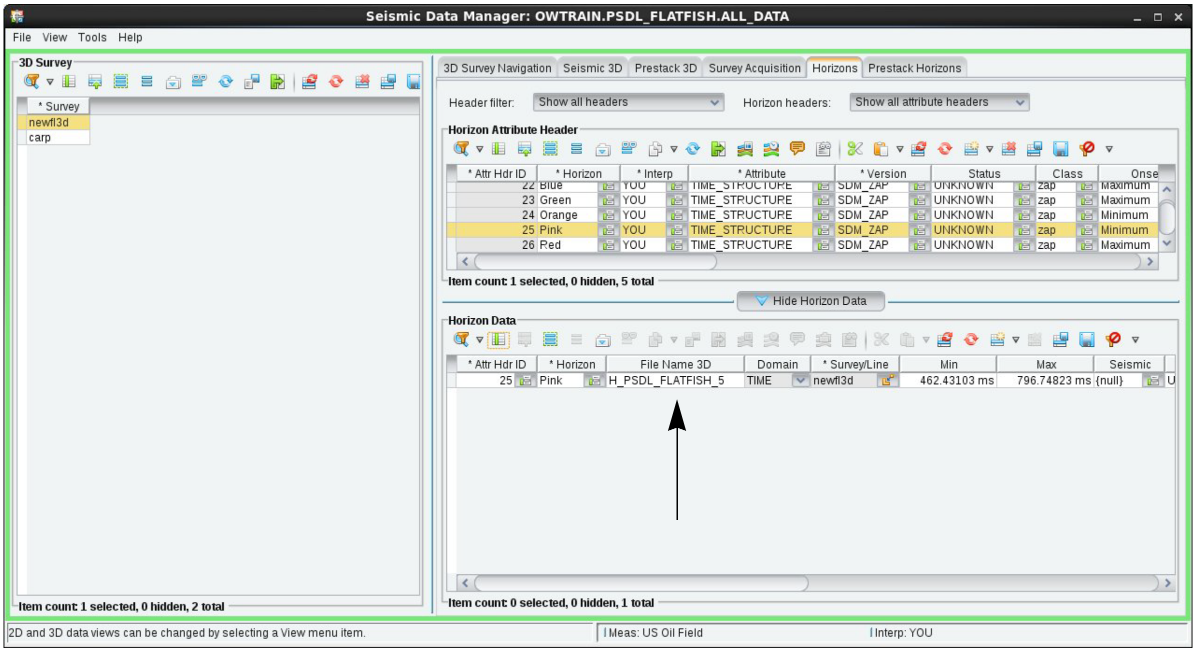
The icon opens the *Column Management* dialog box, which allows you to specify which columns you want displayed, and the order in which you want to display them. However, unless a column is frozen, you can also rearrange the columns dynamically in the interface table by dragging the column right or left.

The default order of frozen columns is initially the same as the order in which they display in the *Column Management* dialog box at the time the **Freeze** check box is selected.

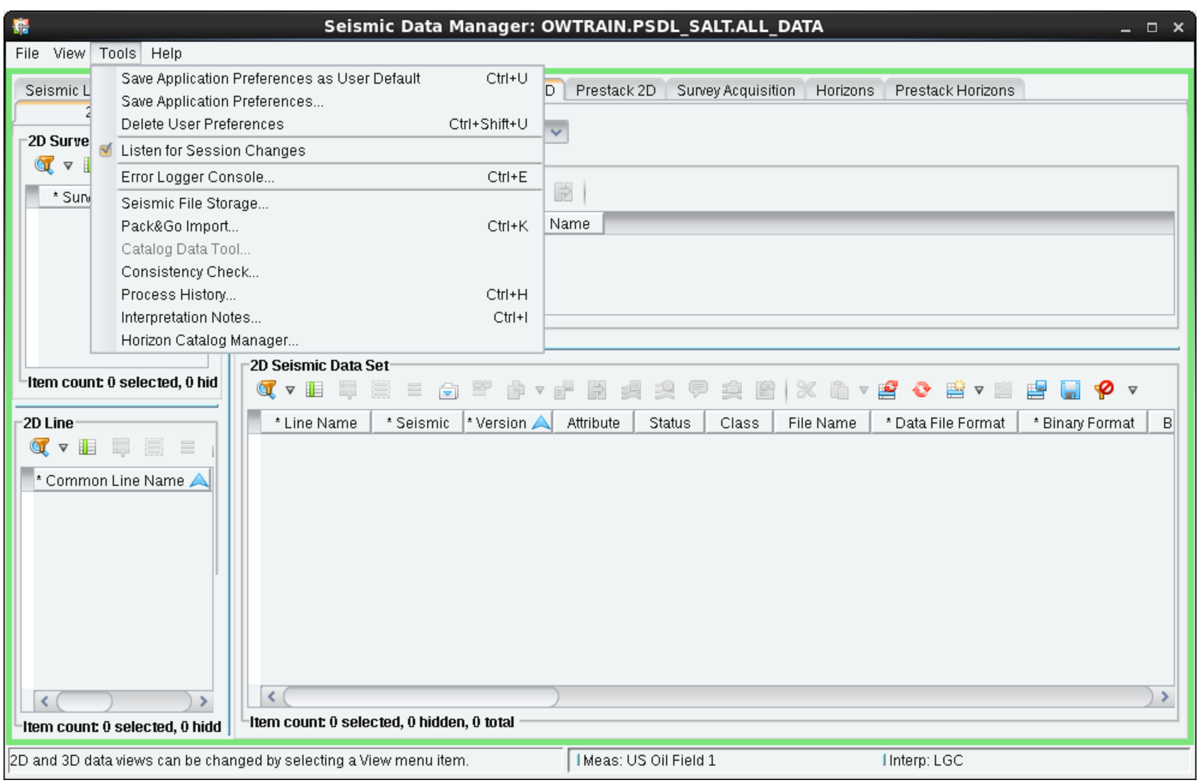
The following tasks can be performed in this dialog box:

- Click the icon to automatically select every **Show** check box. Click the icon to hide all columns.
- Click the icon to freeze all of the columns. Click the icon to unfreeze all columns.
- You can change the order in which columns display by first selecting the row to move and then clicking the move up and move down icons. Only columns that are visible and not frozen can be moved .You can move the columns by using one of the following move icons:
  - to move the checked rows up in the table
  - to move the checked rows down in the table
  - to restore the columns in the table to their original state
  - to save the adjusted settings made in Column Management



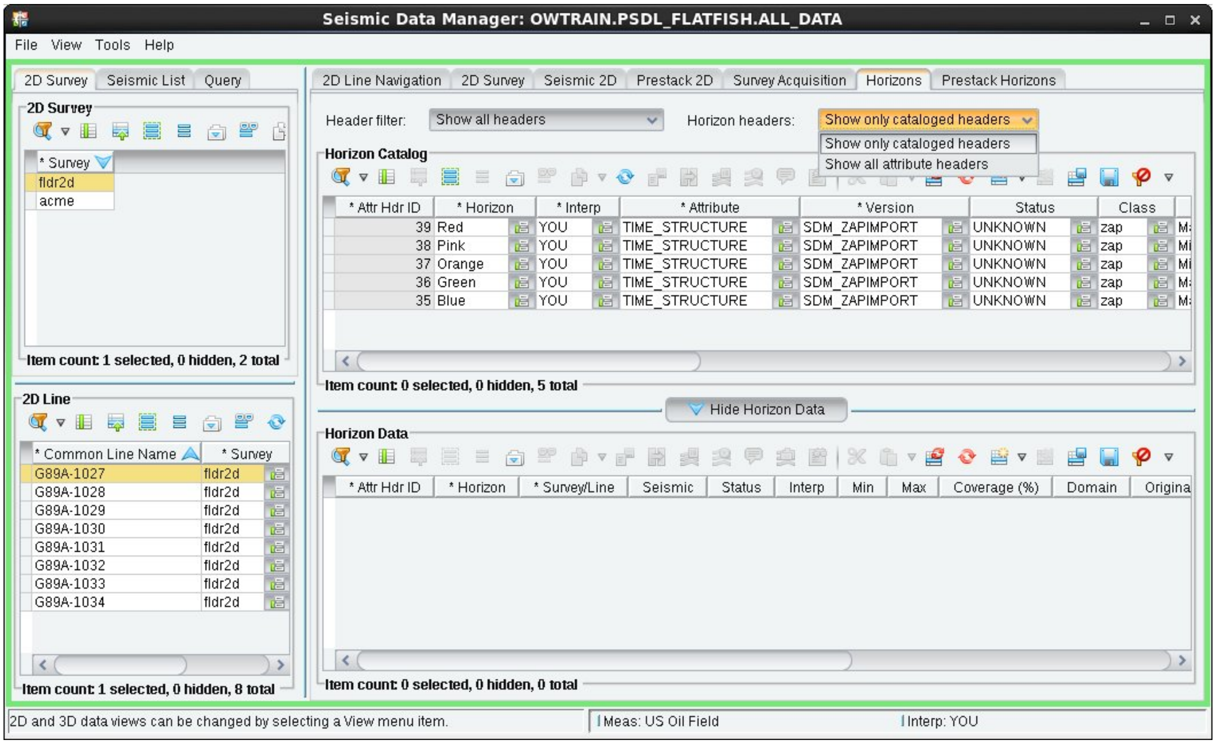


Once you have the columns selected and positioned as you like, you can select **Tools > Save Application Preferences as User Default**. Your selections are now the default view for your user.



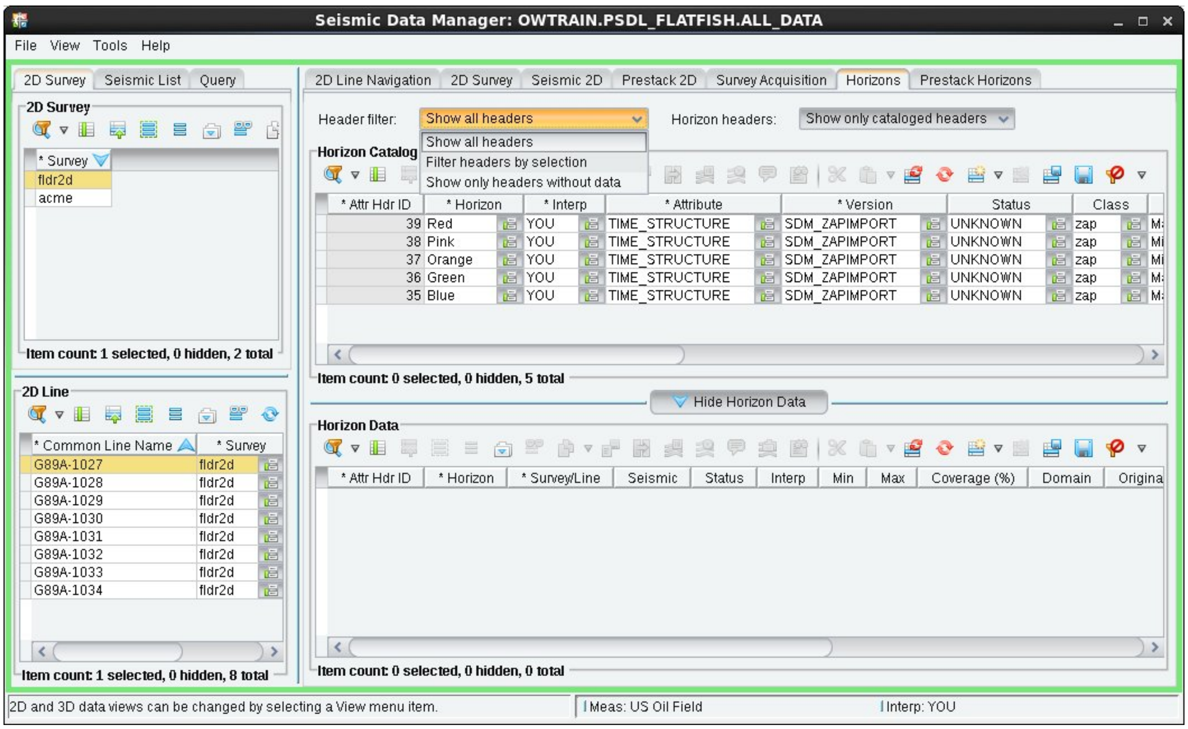
Horizon Filter options:

Filtering options allow you to select all the horizon headers in the project database, or just those from selected surveys. In addition, there is an option to view headers without data (a horizon name was created but no actual interpretation was done).



Headers filter choices:

- Show all headers - all the horizon headers display in the pane
- Filter headers by selection - only horizon headers for the selected line(s) display
- Show only headers without data - only headers without horizon data display



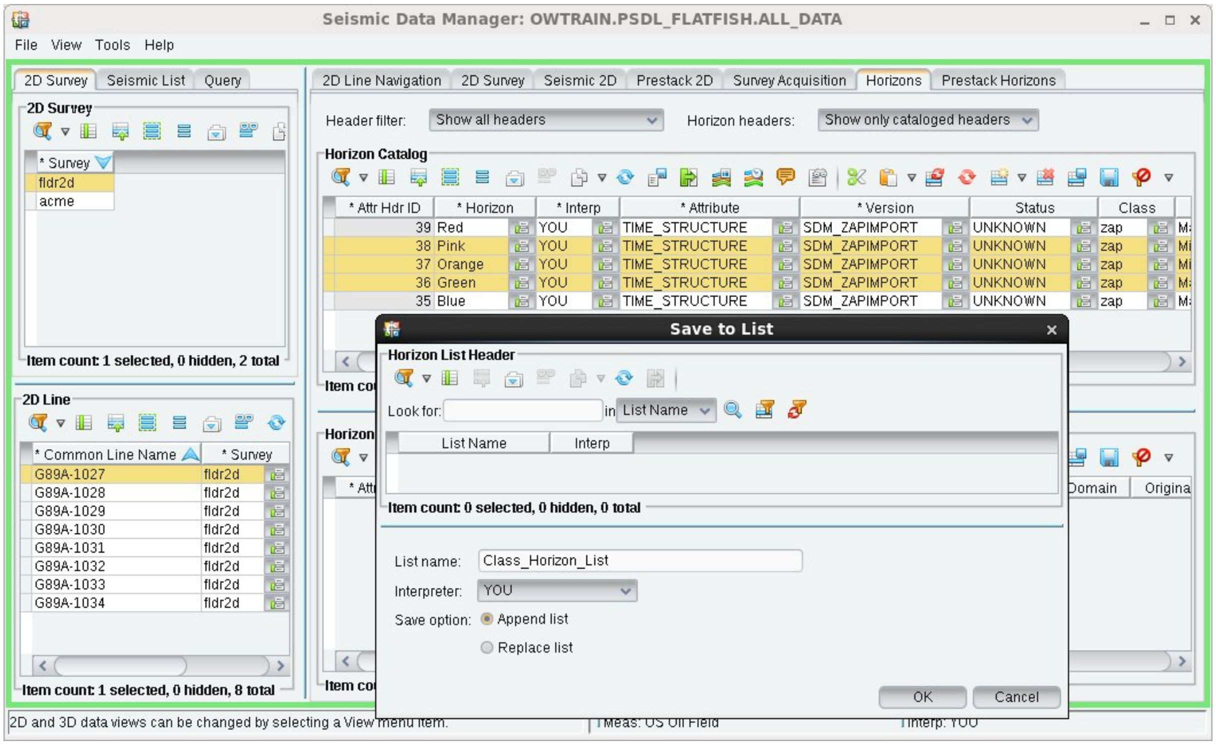
Horizon headers choices:

- Show only catalogued headers - displays headers except those with Attribute "UNKNOWN"
- Show all attribute headers - display all headers

Additional icon function for Horizons:

Icons provide similar functions in the various panes.

When the Horizon tab is selected, an additional icon, *Export current selection to Horizon list* icon ( ) is available to generate a horizon list from the selected horizons.

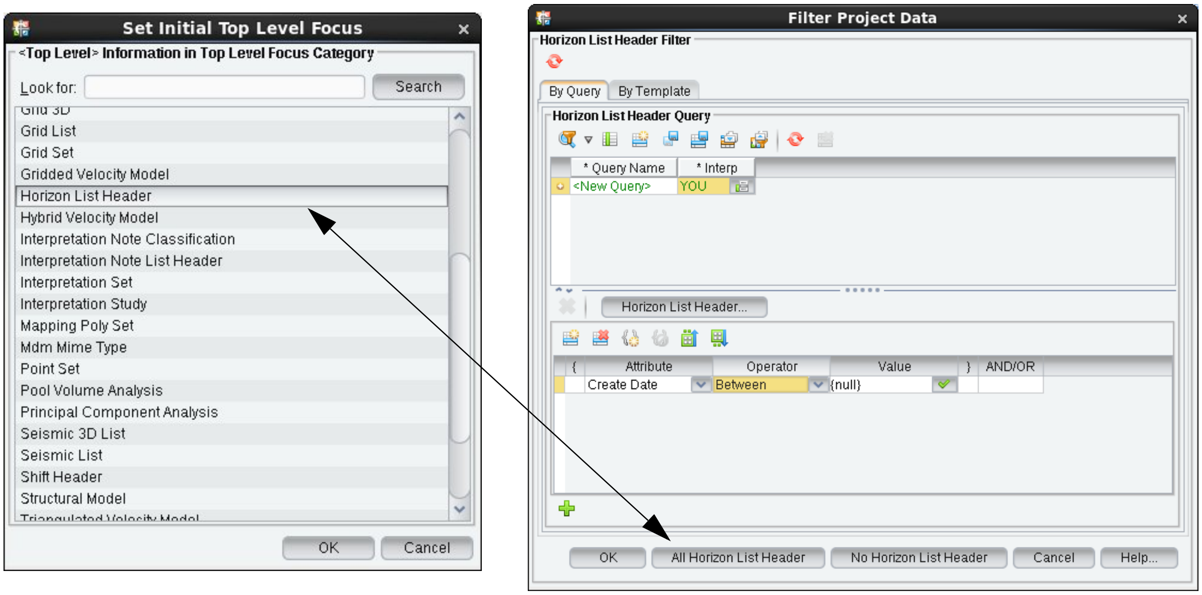


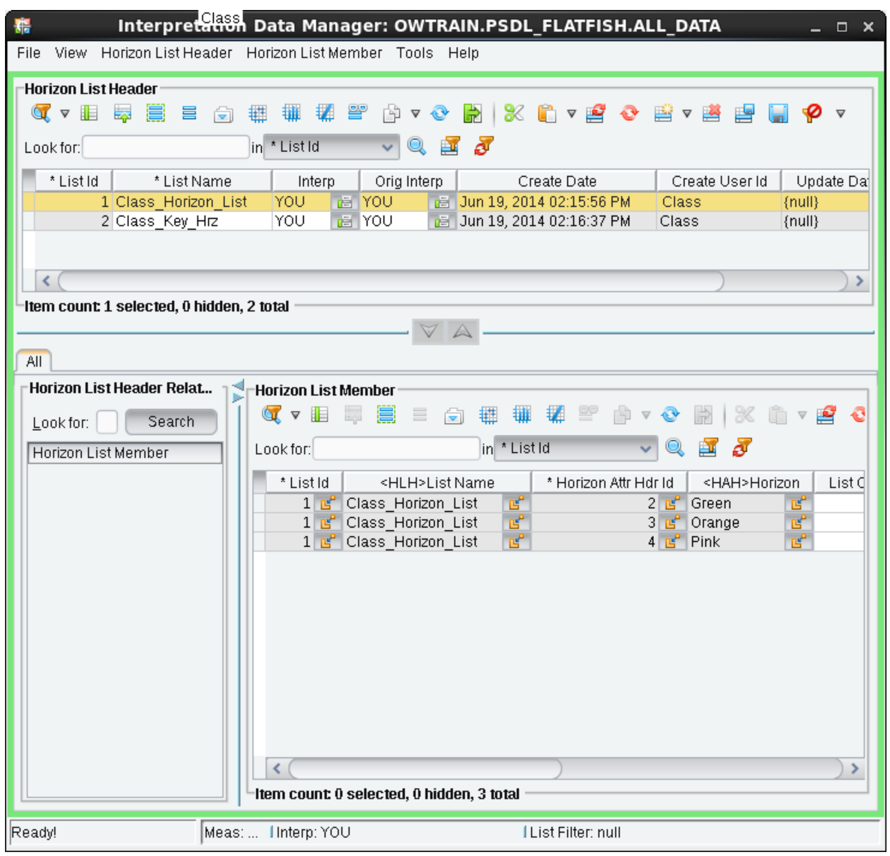
Horizon list data can be managed (viewed, deleted) through Interpretation Data Manager. Select (from the OpenWorks command menu):

Data > Management > Interpretation Data Manager

Interpretation Data Manager is used to manage many types of data stored in the database. The first step when opening this tool is to set the focus to the type of data you want to manage. Next, in the *Filter Project*

Data selection dialog box, choose to filter the data displayed or to display all data of the selected type.



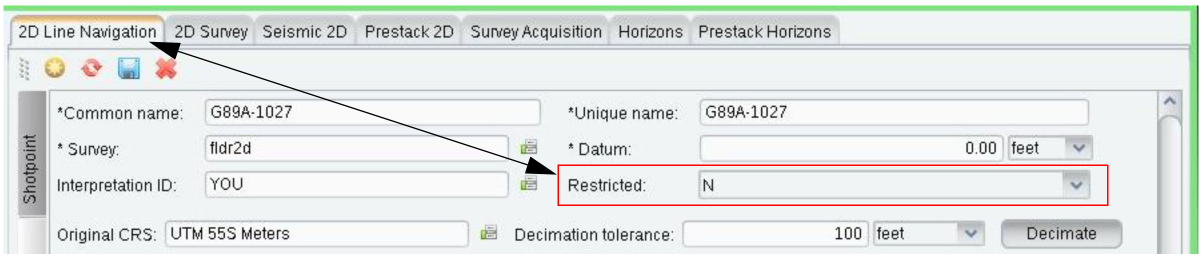


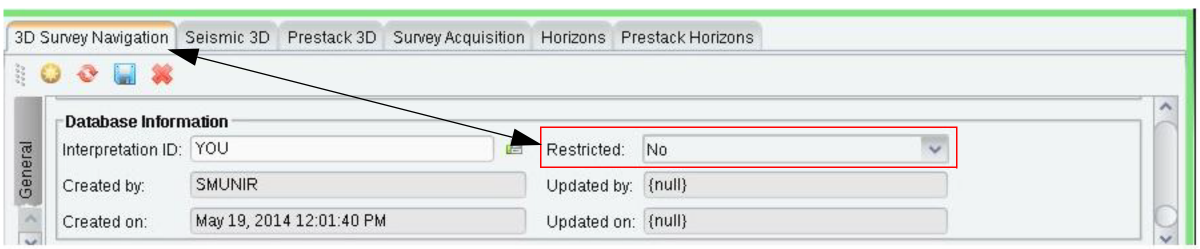
Restricted Data Tight Classification:

2D lines and 3D surveys in Seismic Data Manager can be marked as *Restricted*, allowing sensitive data to be loaded to the project database but be hidden from interpretation projects unless they are specifically granted access to view Restricted Data.

Access to the restricted data is done at the OpenWorks project level.

When you specify a 2D line or 3D survey as restricted, this classification applies to all trace and horizon data for a 2D line or a 3D survey.





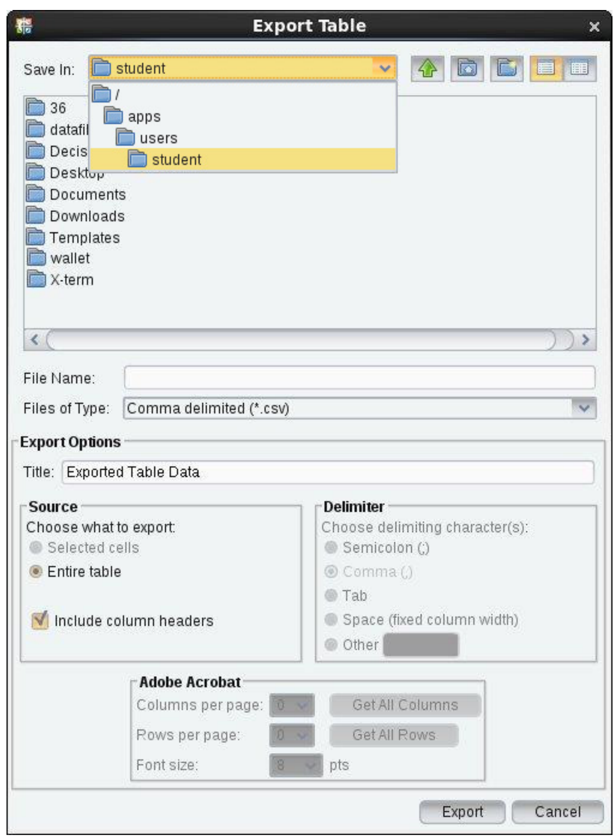
Exercise: Export data to Various Formats

The *Export to various file formats* toolbar icon ( ) allows you to export the contents in your current table. When you click this button, the *Export Table* dialog box displays. The table can be exported to a file of one of the following formats:

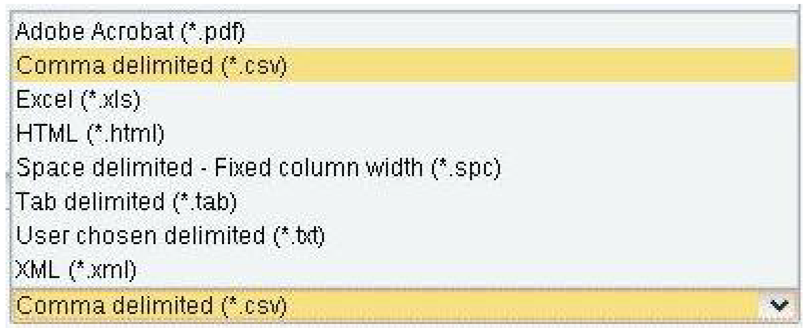
- Adobe Acrobat (*.pdf)
- Comma Delimited (*.cvs)
- Excel (*.xls)
- HTML (*.html)
- Space Delimited - Fixed Column Width (*.spc)
- Tab Delimited (*.tab)
- User Chosen Delimited (*.txt)
- XML (*.xml)

You can do the following in this dialog:

- Click the drop-down arrow to browse to the location where you want to save the table contents.

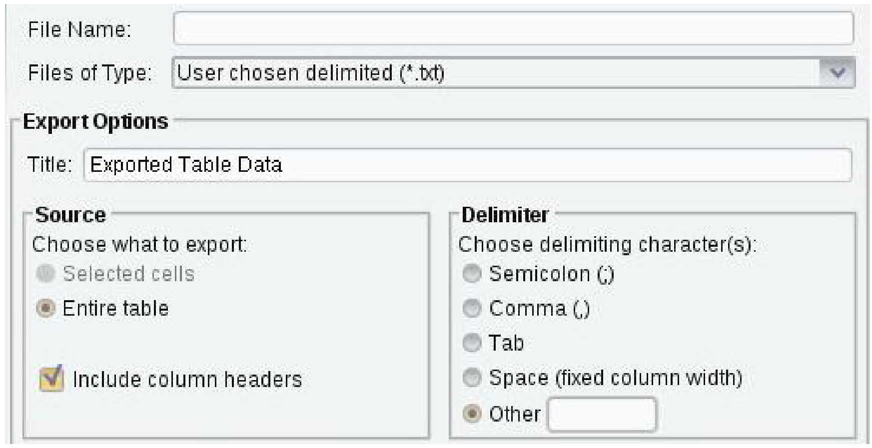


- Specify a file name and specify the type of file in which you want to save your data.



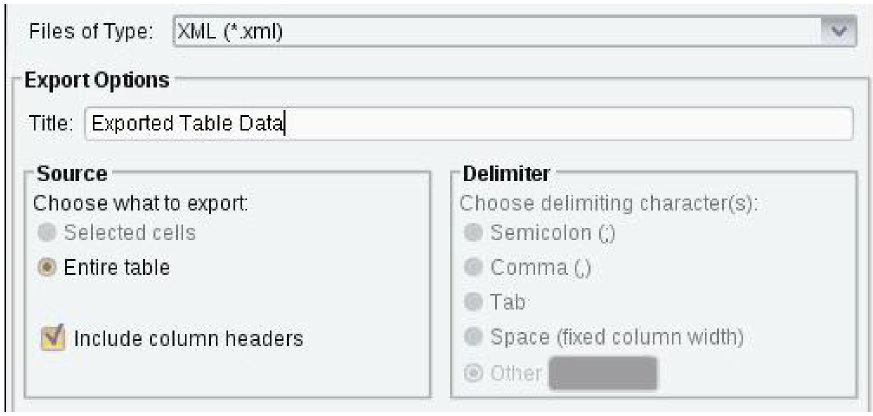
Note: In **Files of Type:**

— If you choose *User chosen delimited* (*.txt), you can specify the delimiting characters (semicolon, comma, tab, etc.) in the Delimiter panel.



— If you choose *Adobe Acrobat* (*.pdf), you can specify Adobe Acrobat options in the Adobe Acrobat panel. You can click the *Get All Columns* and *Get All Rows* buttons. OpenWorks automatically populates the Columns per Page and Rows per Page fields. You can also specify the font size for the text in your output file.

- If exporting to Excel, specify a title for the exported data in the Export Options panel. The title appears in the column heading of the Excel spreadsheet.



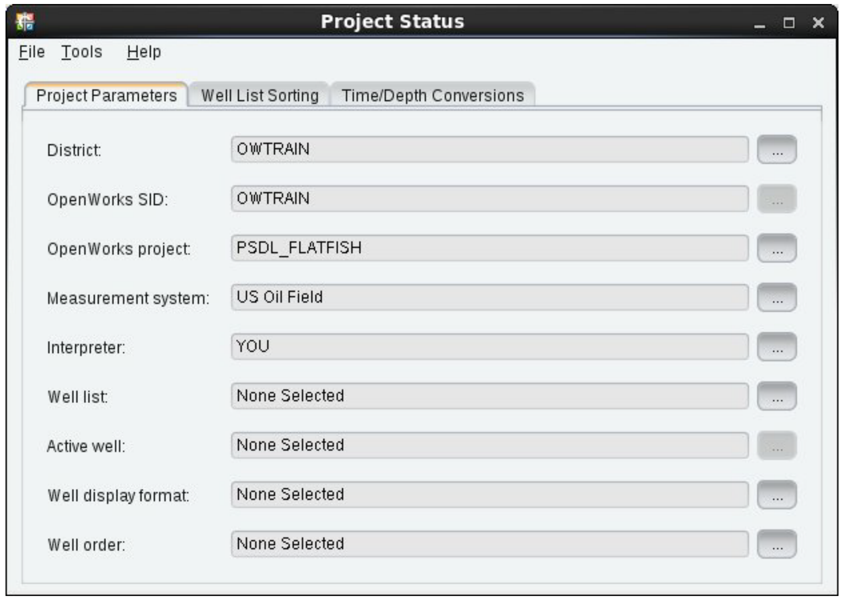
- Choose to save selected cells or the entire table in the *Choose what to export:* option in the Source panel.

- Choose to or not to include column headers in the file format in which you save the table contents.

EXERCISE 1: Export Table Information in Space Delimited Format

The purpose of this exercise is to illustrate the use of the *Export to various formats* option available in many data managers. The export file will contain a list of seismic data sets and selected information.

1. Select PSDL_FLATFISH as the OpenWorks project using Project Status Tool.



2. Open Seismic Data Manager (**Data > Management > Seismic Data Manager**).

3. Select:

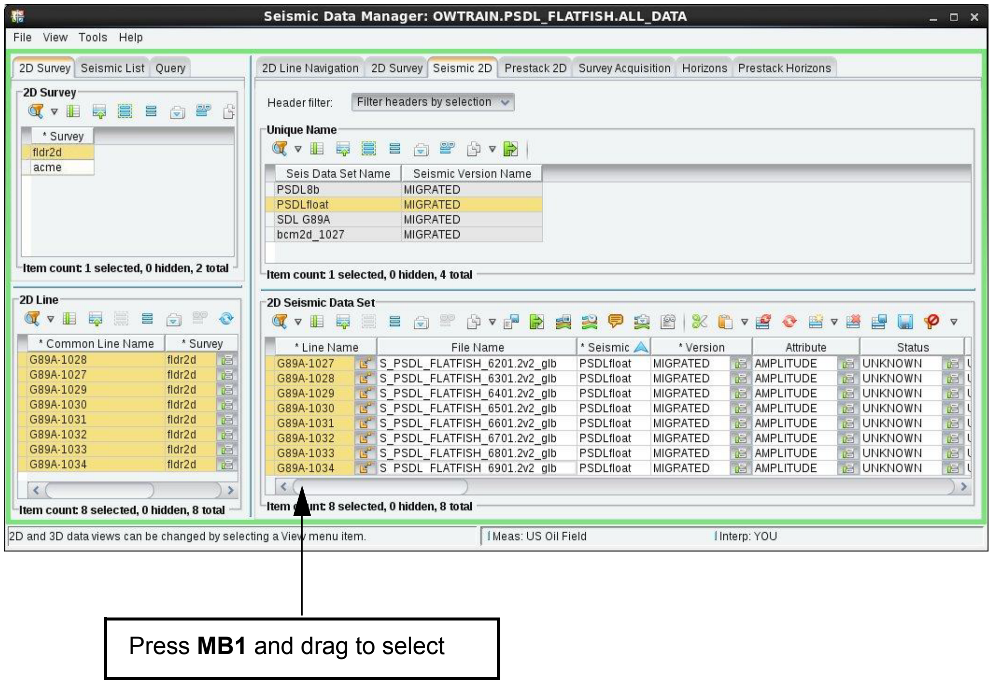
   - *fldr2d* survey
   - all the 2D lines
   - *PSDLfloat* seismic volume

4. Select the Seismic 2D tab in the upper right pane.

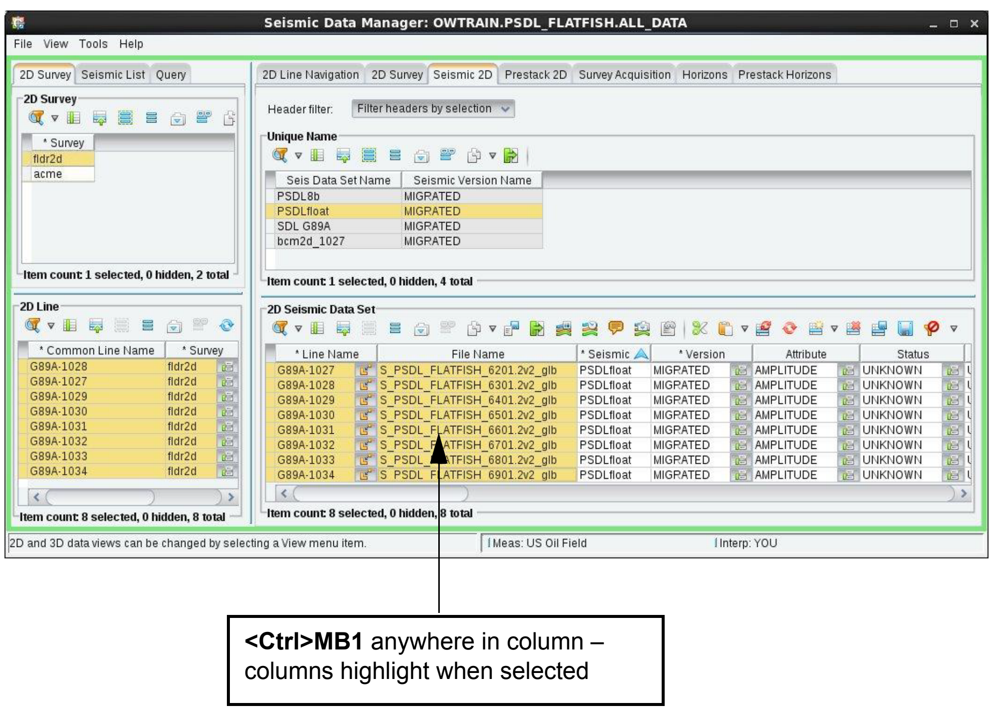
   You can export the entire table or select specific rows and columns you would like to export.

5. To select the rows and columns you would like to export to a file do the following:

   - Select the rows to export by pressing MB1 in one of the columns you would like to export and dragging to highlight a range of rows (or use **<Crtl>MB1** to select specific rows or **<Shift>MB1** to select a range of rows)



- Place your cursor anywhere in the data portion of a column and press **<Ctrl> MB1** in each column you would like to export.



- Select the following columns:

  — Line Name

  — File Name

  — Seismic

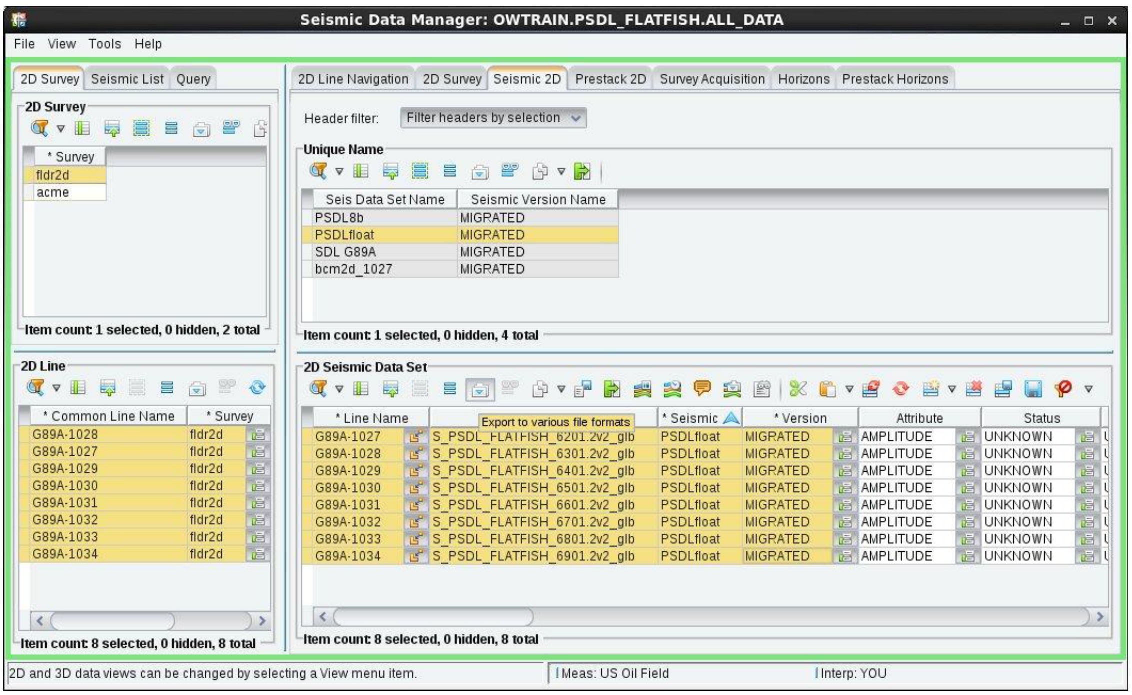
  — Version

  — Binary Format

  — Trace Min

  — Trace Max

  — Sample Rate



6. Click the *Export to various file formats icon* ( ).

   The default location for the file is the user's home directory.

7. Fill out the appropriate information for the type of file you want to export:

   - In *Selection*, supply a name for the file (the extension will be applied automatically based on the file type selected in the Filter option.

   Type: `SeismicDataSetList`

- In *Filter*, select the type of file you want to use for export.

From the dropdown menu select the *Space delimited* option.

Notice that you have the following options:

- export the entire table, or just selected cells
- include column headers

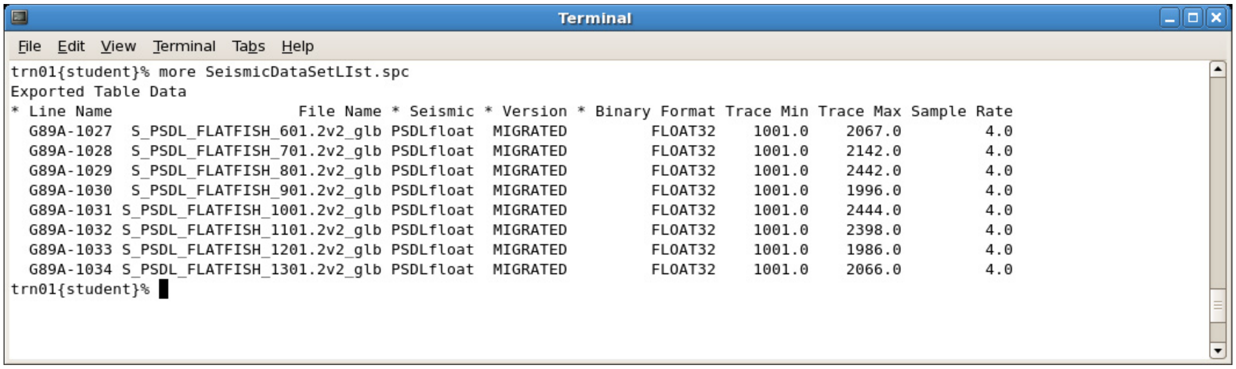
8. Click **Export**. The dialog closes and the file is created.

9. Check the exported file in a terminal window.

   - Open a terminal window (**OpenWorks command menu** > **System** > **Terminal Window**).

   - Navigate to your home directory (or selected location)

- Type `more SeismicDataSetList.spc` to view the file



Exercise: Deleting Seismic Volumes

Seismic Data Manager allows you to delete seismic volumes without the need to navigate to the UNIX directory where the files are stored.

In addition to deleting seismic volumes, you can also delete 2D and 3D surveys (and all dependent data), and 2D lines (and all dependent data). This process is detailed in Chapter 7.

Horizon data can also be deleted in Seismic Data Manager. This workflow is presented in Chapter 8.

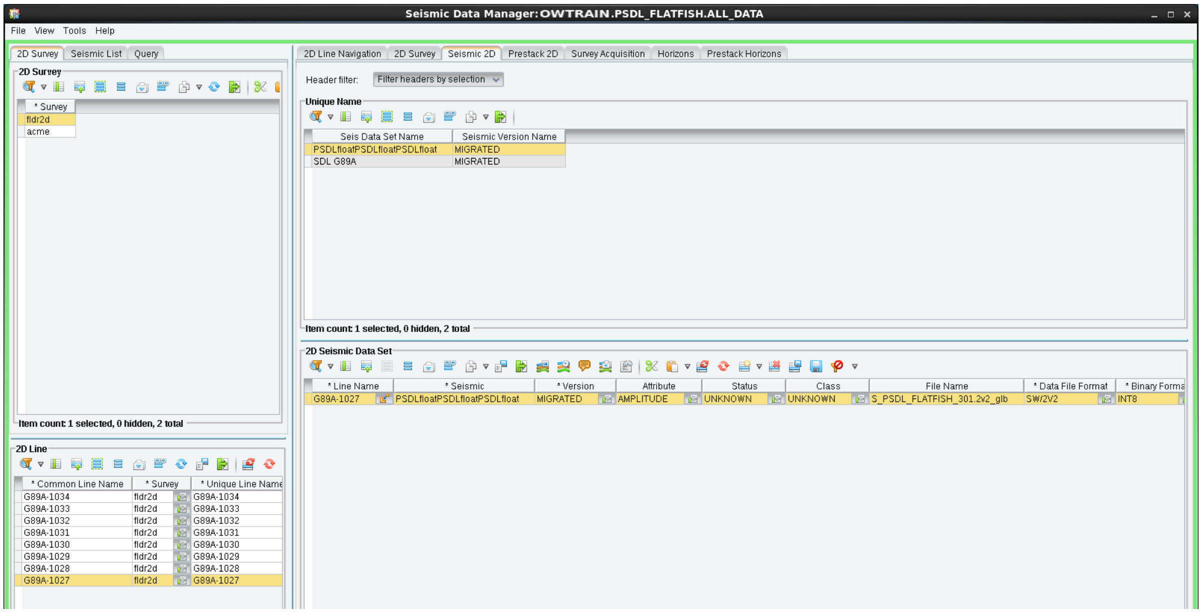
EXERCISE 2: Deleting a Seismic Volume

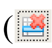
For this exercise you will delete the 2D volume. The seismic data set name is *PSDLfloat_1027* and the version is *MIGRATED*; the OpenWorks project is still *PSDL_FLATFISH*.

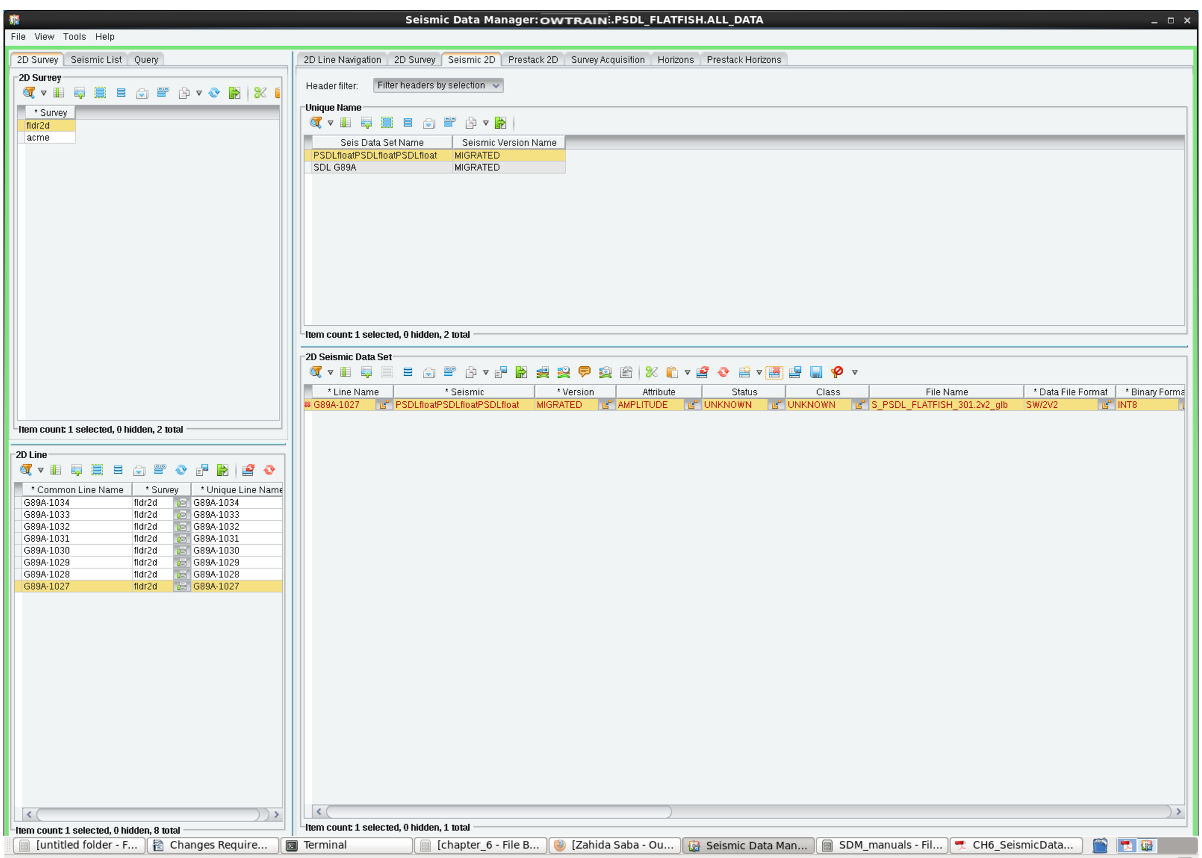
Seismic Data Manager may still be open from the last exercise. If not, open it now.

1. Select the *fldr2d* survey
2. Select *G89A-1027* in the 2D Line list
3. Select the **Seismic 2D** tab in the upper right pane
4. Select the *PSDLfloat_1027*, *MIGRATED* data set name

5. In the 2D Seismic Data Set pane, select the volume (there should be only one for G89A-1027)



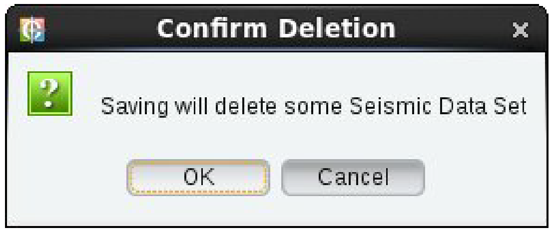
6. Click the **Delete selected Seismic Data Set** icon ()



The data set information changes color to red.

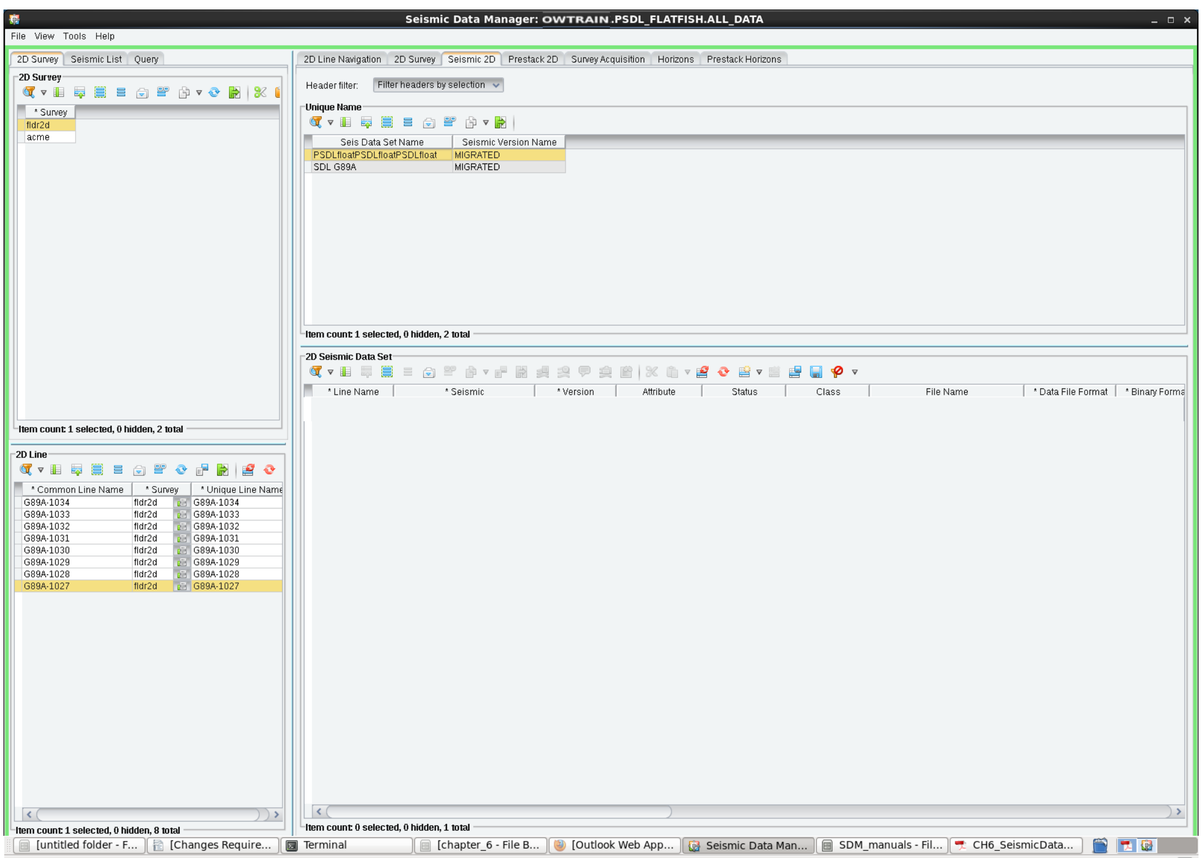
7. Click either the *Save selected rows* icon () or the *Save all rows* icon ()

8. Click **OK** in the *Confirm Deletion* dialog box to complete the deletion process



If you decided that you did not want to delete the volume at this point, click **Cancel** instead of OK, then click the Revert all rows icon (). The data set information changes back from red to black.

Once you click **OK**, the seismic data set is removed.

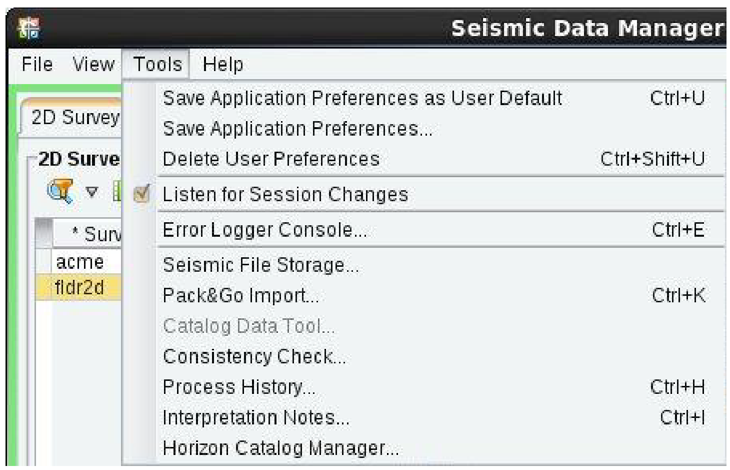


You can delete multiple volumes at one time. 3D volumes may also be deleted using the same procedure.

Tools in Seismic Data Manager

Seismic Data Manager has a set of utilities and options for viewing, deleting, cataloging, importing and exporting seismic navigation, seismic trace and horizon interpretation data. These utilities are accessed from the Tools dropdown menu. Some may also be accessed from the appropriate icon.

Tools Menu:



Tools Options:

User Preference Settings:

- Save Application Preferences as User Default

  — allows you to customize the default view selections for the window

  — saves to a default file, SeismicDataManager.xml, in the user home directory called ./lgcPrefs

  Change the column options to select or move column headers as you prefer, or change the icon size, then select this option. Seismic Data Manager will automatically open with these selections for your user.

To return to the "factory shipped setting" simply delete this SeismicDataManager.xml file from $HOME/.lgcPrefs, or use the delete user preferences option.

- Save Application Preferences…

— allows you to save preferences to a file name

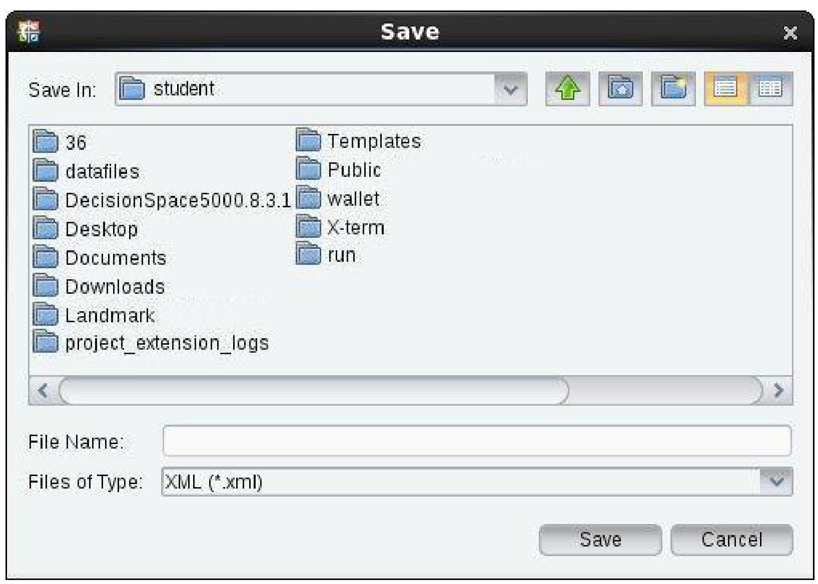
The file is saved in the user home directory, where the preference can be saved in a separate file.

This means that the $HOME/.lgcPrefs/ SeismicDataManager.xml file will not be altered.

Many different preference files can be saved with different column visibility, column freeze, and sort order and column organization style, and can used to display different reports. These files will have the extension .xml.

The workflow to use one of these saved files is to make a copy of the file in $HOME/.lgcPrefs/ SeismicDataManager.xml and then overwrite the contents with a saved version. For example, to save a file called my_report1_sdm, do the following:

```
% cp my_report1_sdm.xml $HOME/.lgcPrefs/SeismicDataManager.xml
```



- Delete user preferences

— deletes your user preferences and returns to the default view default view selections for the window

Update and Error Message Settings:

- Listen for Session Changes

  The OpenWorks data managers listen for the following session changes:

  — OpenWorks project name

  — Measurement system

  — Interpretation ID

When these parameters change, the data managers change the data they display. However, some data managers have a menu option which allows the data manager to keep the current session parameters and avoid session changes. This function allows you the flexibility to view more than one set of data. For instance, by opening more than one instance of Well Data Manager, you could look at the well data from more than one project.

— To prevent session changes in a data manager, uncheck **Tools > Listen for OW Session Changes**

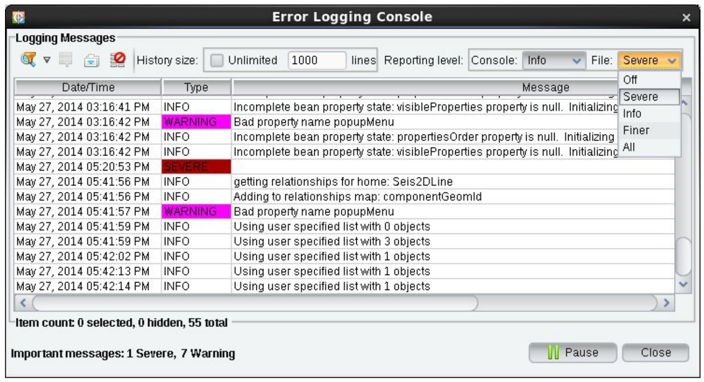
Pointing Dispatcher Software:

When the project is changed outside of the data manager, the data manager will not be able to send data with or receive data from the Pointing Dispatcher service. When the session project and the project accessed by the data manager become the same again, the Pointing Dispatcher service is again enabled for the data manager.

— To allow a data manager to change when the session parameters next changes, check Tools > Listen to OW session changes

- Error Logger Console…

The error logging function allows you to display the information in the *Error Logging Console* dialog box and also in a file. Error Logging Console allows you to configure what messages are reported in each location.



- Type

Classifications of the messages:

— ALL - Means all the messages will be displayed in the dialog box.

— FINER - Defines the granularity of the sorting of the log messages and displays them with as FINE, FINER, FINEST.

— INFO - Defines the log messages as INFO, WARNING (has a yellow background color), or SEVERE.

— SEVERE - Defines the log messages type as SEVERE (has a red background color).

Details:

If a message is severe, a More Information (...) button displays in the row. Clicking the button displays a *Log Details* dialog box. The dialog box contains information of where the error occurred. Often the information in this dialog is best handled by Landmark Support.

Management Utilities:

Seismic File Storage…

Allows you to define subdirectories for the seismic files in 2D and 3D surveys and 3D horizons; also allows you to perform various operations on the seismic files using commands available at the command line

The parent directories or file systems where the subdirectories are created are defined in dir.dat.

Pack & Go Import…

Allows you to import data stored as files (3D horizons, 2D poststack seismic data and 3D prestack and poststack seismic data) from one project database to another.

As input, the Pack & Go Import (Tools > Pack & Go Import) can only use XML files produced by Pack and Go Export.

The Export tool provides xml files which contain the catalog and metadata information about the external files, and optionally, the external files. With the Export and Import tools, you can consolidate or transfer data between projects and districts.

Catalog Data Tool…

Allows you add 3D seismic data files to a previously defined 3D survey in an OpenWorks project without using a seismic data loader or importer

In essence, the data is added to the seismic catalog (the Seismic_Data_Set table) for a 3D survey in the OpenWorks database instance so that the data can be made available in a project and to applications accessing the project.

The data can be added to a survey if:

— the data files are in one of the following formats from Landmark software

File Suffix	Description
3dv	Vertical seismic data file in Landmark format
bri	Vertical seismic data file in Landmark bricked format
cmp	Vertical seismic data file in Landmark compressed format

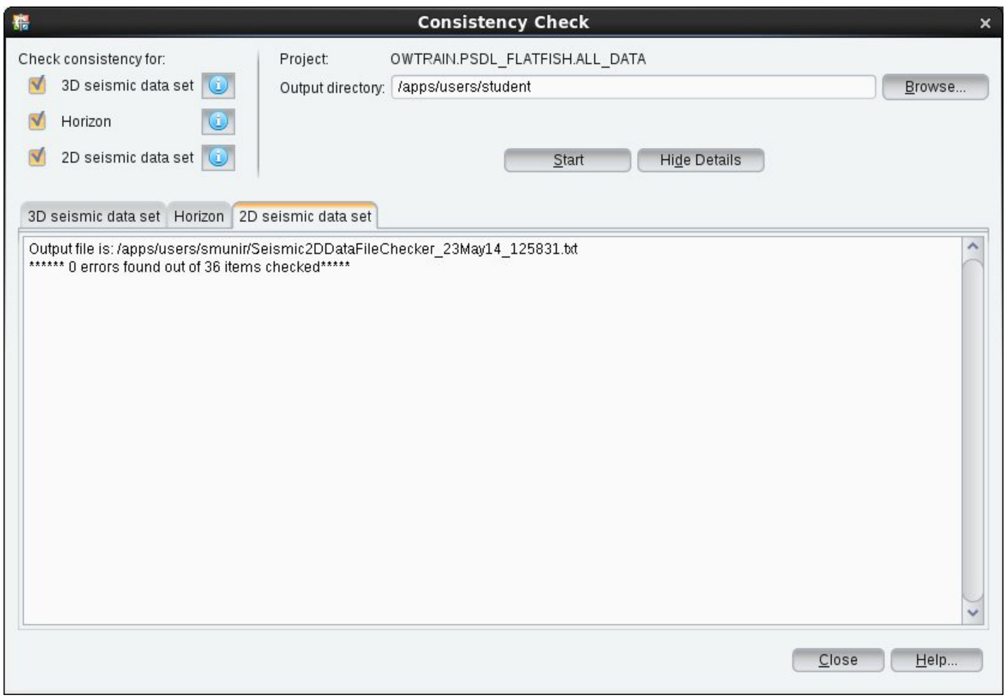
— the data are not included in another 3D survey in the project

— the files are placed in the location where the other seismic files are for the survey (the location is defined by the configuration file, dir.dat, and by the Seismic File Storage tool)

Consistency Check…

Allows you to check whether the OpenWorks Software can access external files cataloged in a project

The tool can check for the external files of one or all of the following: 2D seismic data sets, 3D seismic data sets, and 3D horizons.



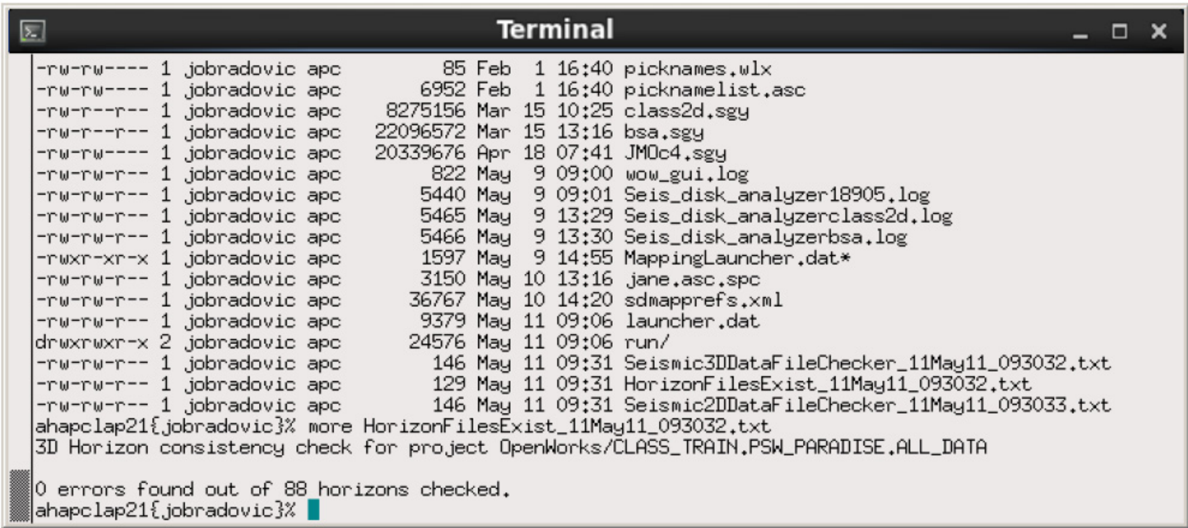
After checking for the existence of the files, it will display the results in the *Consistency Check* dialog box and will record the results in a file with a pathname similar to the following:

Dir/DataType_ddMMMyy_hhmmss.txt

Where Dir is the directory where the results are stored. By default the directory is your home directory.

DataType is Seismic2DFileChecker, Seismic3DDataFileChecker, or HorizonFilesExist.

ddMMMyy is the date the check was done, hhmmss is the time the check was done.



If errors occurred you may need to find the missing files and place them where they should be, as defined by the dir.dat configuration file and the Seismic File Storage tool, or you may need to open the Seismic File Storage tool to correct the path.

Process History…

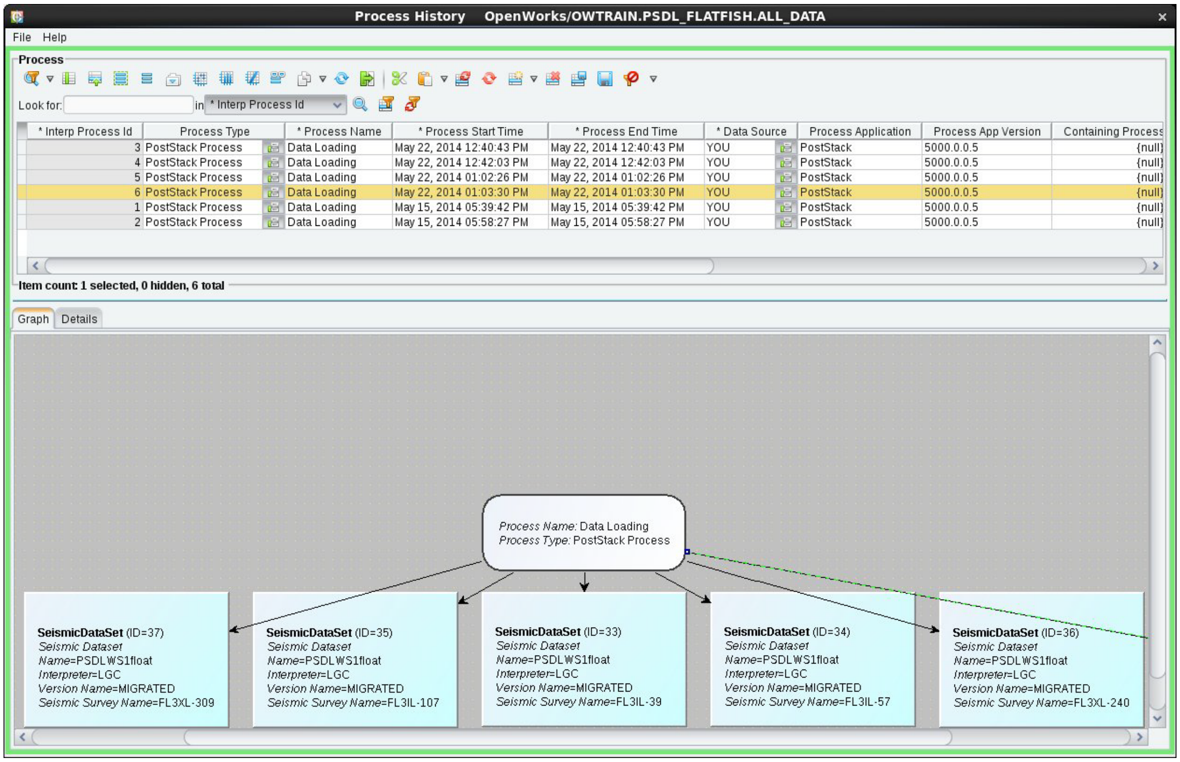
Alows you to view and manage processes and Process histories for various data types stored in an OpenWorks project.

Allows you to record the process history of data that may be missing, because an application may not record information about its processes, or because it does not store the process information in the OpenWorks project.

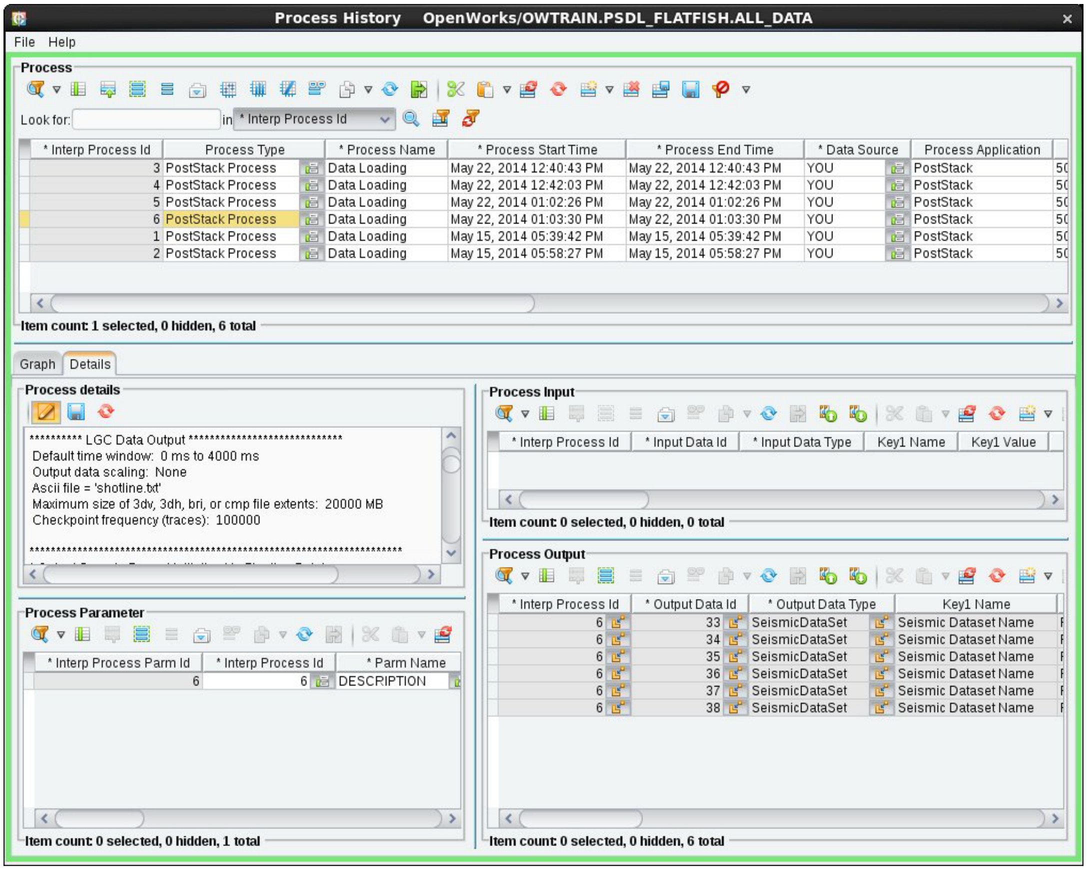
Allows you to view information about the data inputs and outputs, the processes, and the parameters of the process as well as view notes about the process.

A process can be viewed as a graphical representation or in a detail view in a table format.

Graph format:



Details format:



Interpretation Notes…

Allows you to attach additional information to a data object in the form of free-form remarks.

Interpretation notes are:

— tied to a point in x, y space and can be used to create long remarks, and attach drawings, documents, and web links

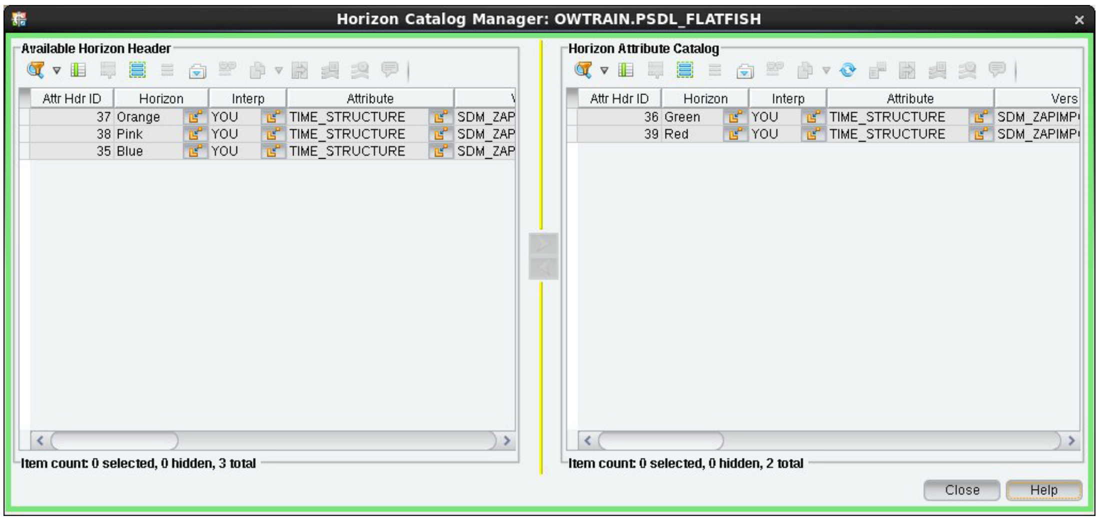
— able to facilitate cross-discipline communication by providing immediate, on-demand, and additional information that other users may require to complete their portion of an interpretation

— managed within the interpretation applications, but are stored in the OpenWorks database

Horizon Catalog Manager…

Allows you to select which horizons will be available in an interpretation project.

The tool allows you and your team to concentrate on just the horizons that are of interest and to avoid the distraction of other horizons in the interpretation project.



To use the Horizon Catalog Manager tool in Seismic Data Manager:

1. Select **Tools > Horizon Catalog Manager…**

2. To make one or more horizon headers *available* in SDM and other applications:

   — Select the row of each horizon in the Available Horizon Header table in the left pane

   — Click the Right-Pointing Arrow button ( )

3. To make one or more horizon headers *unavailable* in SDM and other applications:

   — Select the row of each horizon in the Horizon Attribute Catalog table in the right pane

   — Click the Left-Pointing Arrow button ( )

To select contiguous rows of horizon headers, use *Shift-MB1*, or drag with the mouse over the horizon headers. To select a non-contiguous rows of horizon headers, use *Ctrl-MB1*.

4. Click **Close**

Exercise: Pack & Go Utility

The Pack & Go utility moves data types that reside in flat files and that have metadata references to it in the OpenWorks database. It can be used to export 3D horizons and 2D, 3D, and pre-stack seismic data from one project into a format that can be imported readily into another database.

Another option, Project Data Transfer (PDT), accessed from the OpenWorks command menu (select **Project > Project Data Transfer**), provides a quick method for transferring data stored in a database from one project to another.

PDT supports data transfer for the following:

- Basin Data
- Field Data (including production data)
- Lease Data (including production data)
- Facility Data (including production data)
- Facility Data (including production data)
- Well Data (including production and process history data)
- Wavelet Data
- 3D Seismic Survey Data (including process history data)
- 2D Seismic Line Data (including process history data)
- SeisWorks Fault Data (including process history data)
- Shift Set Data
- Stored Query Data
- Strat Column Data
- Line of Section Data
- Interpretation Data (including process history data)
- Well Template Data
- List Data
- Earth Model Data (including process history data)
- Well Planning Project Data
- Velocity Model Data (including process history data)
- Process History Data
- General Application Data

PDT and Pack & Go should be the only two utilities you need to transfer all data to another database.

A brief synopsis of data types in OpenWorks and I/O methods is provided below.

Data Type	**I/O Methods**
Non seismic data types (well, production, planning, lists, velocity models, etc.)	• Project Data Transfer • Data Export/Import (Classic) • Curve Import (Classic) • Data Export/Importt
Seismic navigation data	• Data Export/ Import • Project Data Transfer
3D Horizons	• Seismic Data Manager ‘Pack & Go’ • SeisWorks Mltimport, Mltexport • SeisWorks Data Transfer utilities
2D and 3D PostStack data (2v2_glb, 3dv, 3dh, bri, cmp format)	• Seismic Data Manager ‘Pack & Go’ • SeisWorks Data Transfer • Seismic Converter • PostStack Data Loader
2D and 3D Prestack data	• Seismic Data Manager ‘Pack & Go’
Shift Set Data	• Project Data Transfer

The Pack & Go Export tool (), accessible from Seismic Data Manager, allows you to export data stored as files (prestack horizons, horizons, and 2D and 3D seismic data) from one project database to another. The export tool provides xml files that contain the catalog and metadata information about the external files, and optionally, the external files.

Pack & Go Import (**Tools > Pack & Go Import**) uses the output of the Export tool to import the horizons and seismic data into a project database. With the Export and Import tools, you can consolidate or transfer data between projects and districts.

Project Data Transfer may be used to transfer data directly (no files are created as with the Pack & Go utility) within a *single* district from one project database to another. All inter-district seismic data transfer must use the Pack & Go Utility.

Exporting Seismic Data and 3D Horizons with Pack & Go

Pack & Go options will export the following data types:

- 3D Seismic Data
- 3D Horizons
- 3D Prestack Horizons

To use the option, select the data to export in Seismic Data Manager and click the *Pack & Go Export* icon ( ).

Pack & Go Export options:

- **Create a list of files for copying later**

  Selecting this radio button produces:

  pnglst file: One file, which contains the original path name of each data file associated with the chosen data item. This list can be used with scripts which can manipulate the data files, such as copy or move the files.

  xml files: One file for each chosen data item, containing metadata about the data item. The path names recorded in the xml file for the data files are the original path name of the data file associated with the data item. The path name is determined by the dir.dat configuration file.

- **Copy Files To Export Directory**

  Selecting this radio button produces the same files as the other selection, but with the following differences:

  xml files: The path names recorded in the xml file for the data files reflect your directory path selection.

  Other files: The data files described in the xml files are copied to your directory path selection.

> **Note**
>
> When moving data to another OpenWorks Instance (OWSYSSID), before importing the data from the Pack & Go Export tool into another OpenWorks instance (OWSYSSID), make sure that the OpenWorks instance has all the coordinate reference systems (CRSs) associated with the data being imported.

EXERCISE 3: Pack & Go Export 3D Seismic and Horizon Data

In this exercise, you will export horizon *Pack & Go* files and then import them into another project database.

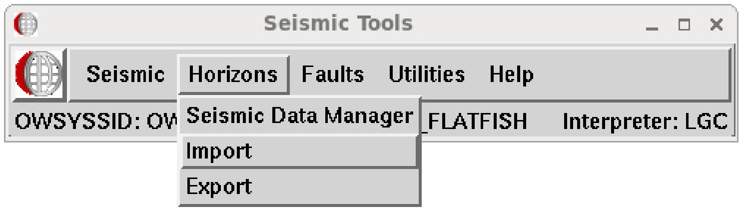
To start, select the project database where you want to add or update the seismic or horizon data.

Part 1: Import Horizons with Mltimp

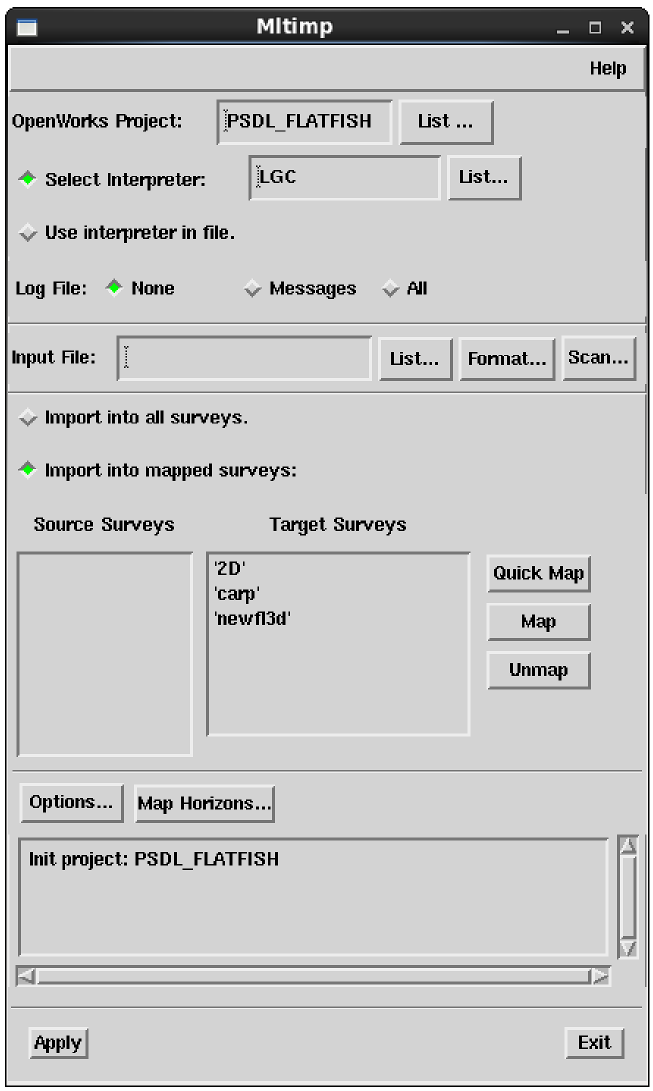
1. If the PSDL_FLATFISH project database is not your selected OpenWorks project, select it now using Project Status Tool, and set your Interpreter ID.

   Normally you would be working with projects that are populated with interpreted horizons. In order to get some horizon data into this project to use for Pack & Go, you will use Mltimp to import horizons in an ASCII file. In Chapter 8 you will learn more details of how to import and export horizon files using Mltimp and Mltexp.

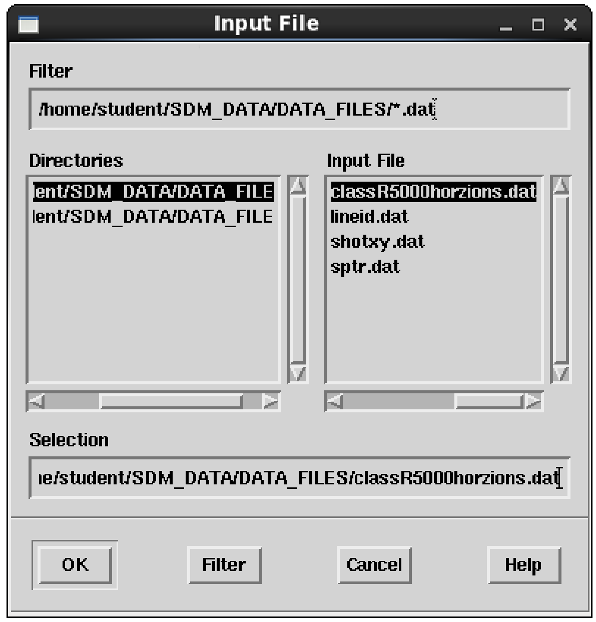
2. Open Seismic Tools (from the OpenWorks command menu select **Data > Management > Seismic Tools**) and select **Horizons > Import**.



3. In the *Mltimp* dialog box, click **List…** to select PSDL_FLATFISH for the OpenWorks project.



4. For the Input File, click **List…** to select *classR5000horizons.dat*.



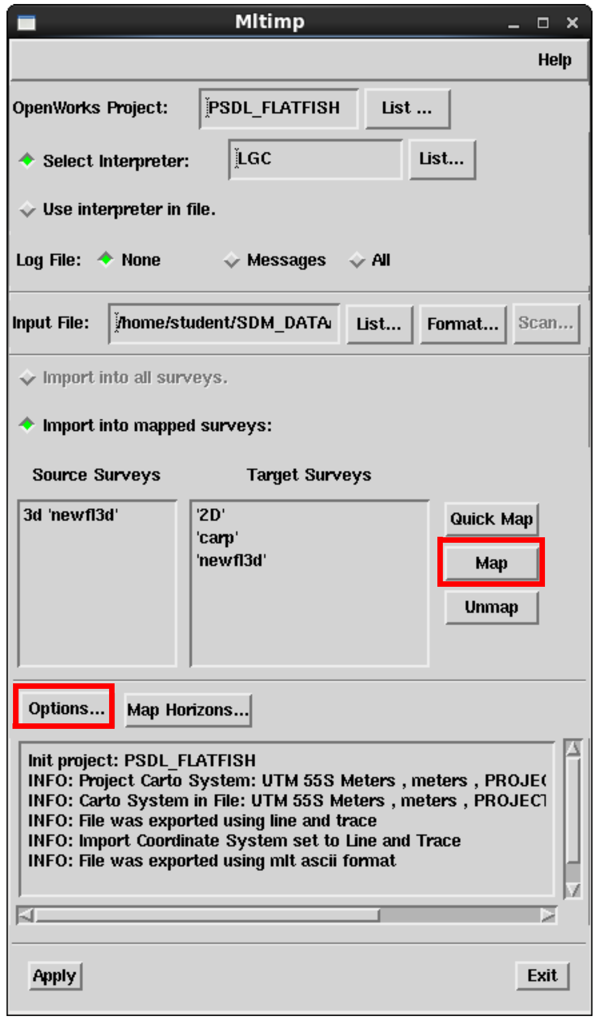
5. To associate the horizons with a survey, select the Source survey (**3d 'newfl3d'**) and highlight the target survey (**newfl3d**) to tell the Mltimp which survey to associate with the horizon data, then click **Map**.

Map Options:

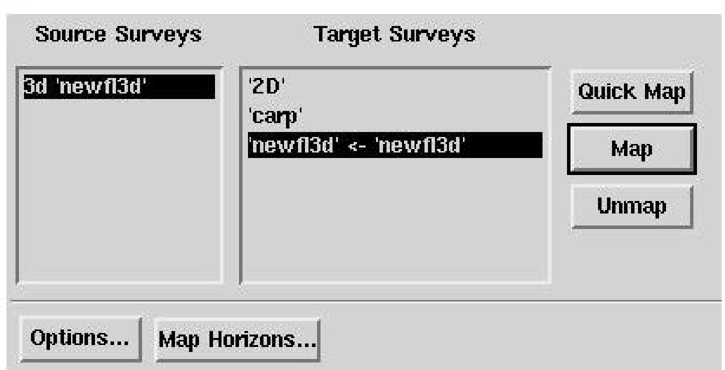
Quick Map:
Matches the source survey with the closest name to the target—you don't have to select the survey to use this option

Map:
Highlight the source survey and the target survey, then click **Map** (you choose the surveys)

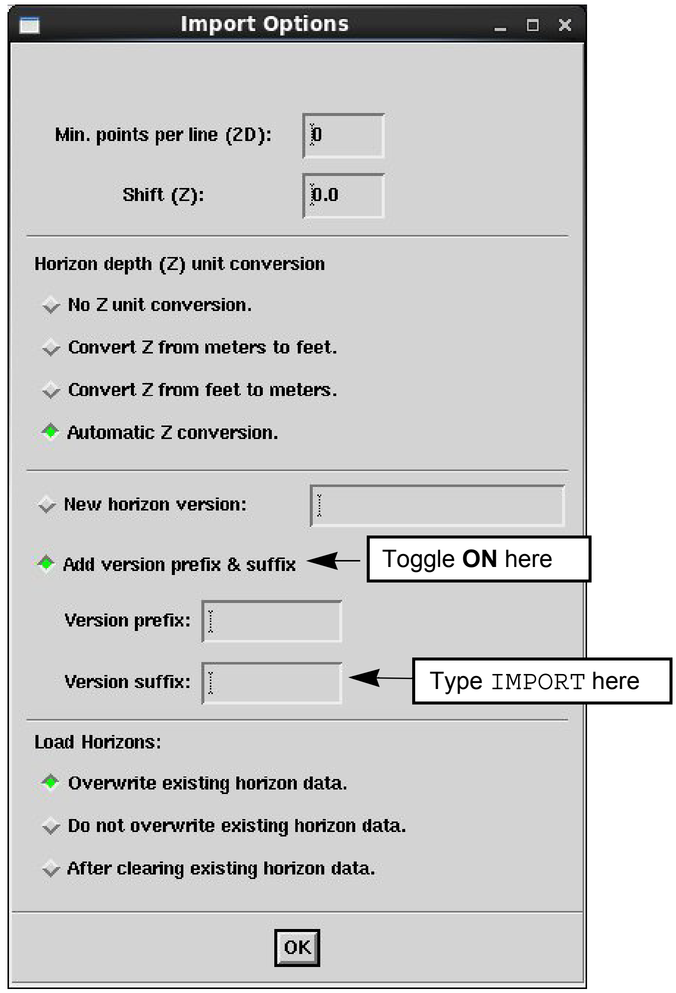
Unmap:
Removes any mapped survey assignments



After you click the **Map** button, the survey selection changes:



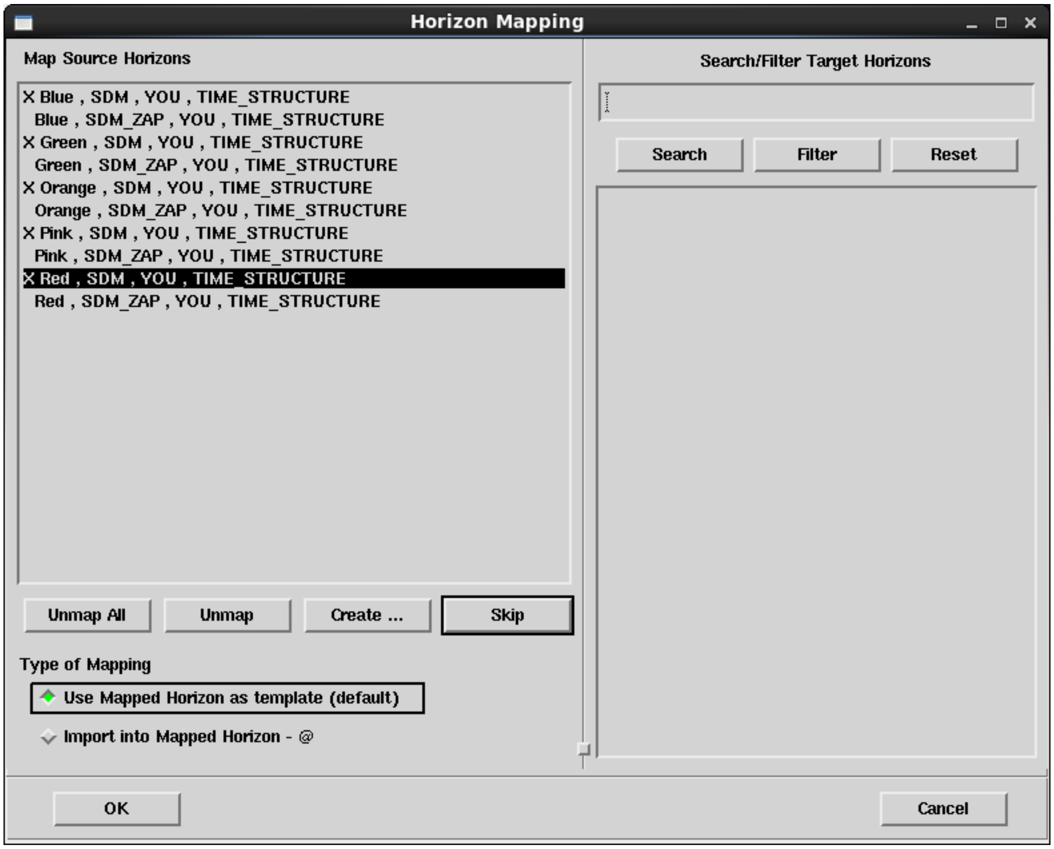
6. Click **Options…**to see the various import options for this type of file. You could let these default, but for this exercise add *IMPORT* as a version suffix. Click **OK** to close.



7. Click **Map Horizons…**to associate the horizons from the import file to horizons in the target file.

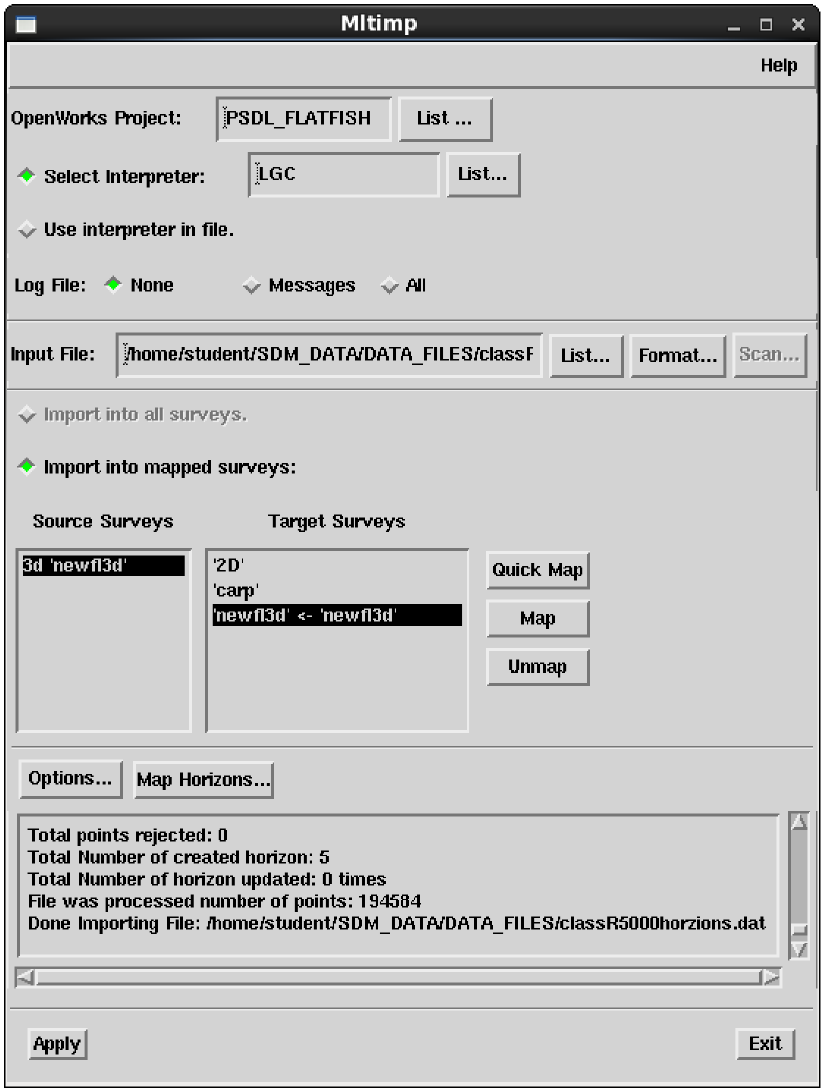
8. Import only the SDM_ZAP horizons by selecting the other horizons (one at a time) and clicking **Skip**. This procedure places an X next to the horizons that won't be imported.

As there are no horizons yet in the target project, the default *Use Mapped Horizon as template* option will import the horizons using the same name as in the file, but adds the *IMPORT* suffix from the options selection.



9. Click **OK** to close the *Horizon Mapping* dialog box.

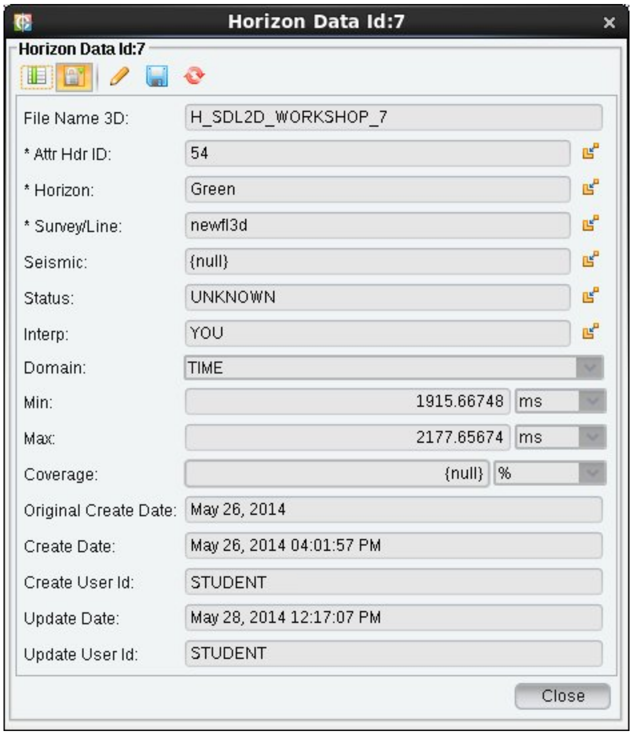
10. Click **Apply** at the bottom of the Mltimp dialog.

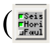


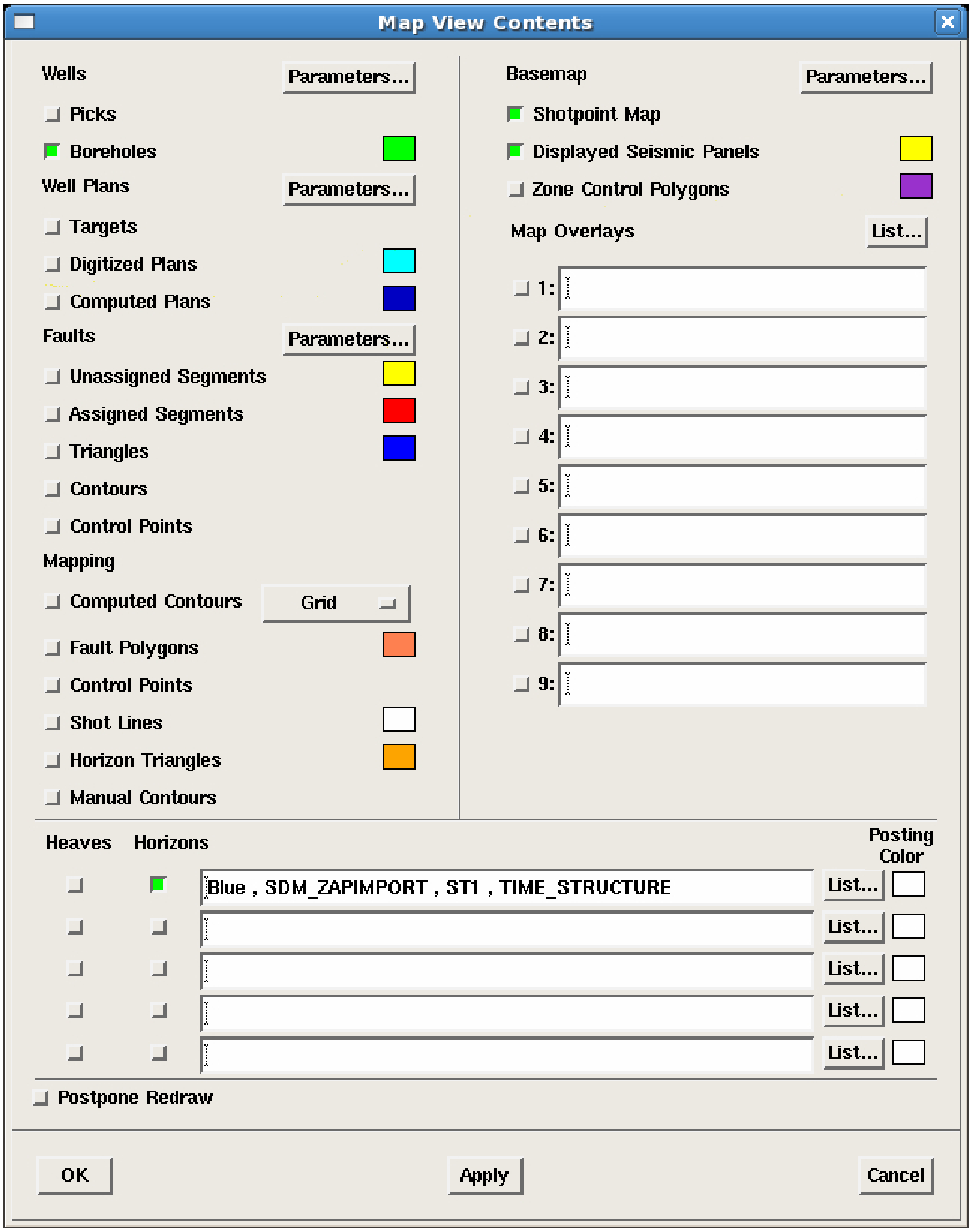
An import summary is listed in the dialog. Scan this report for any errors.

Check the horizons in Seismic Data Manager and take a look at them in SeisWorks Map View or WOW to see what you just imported.

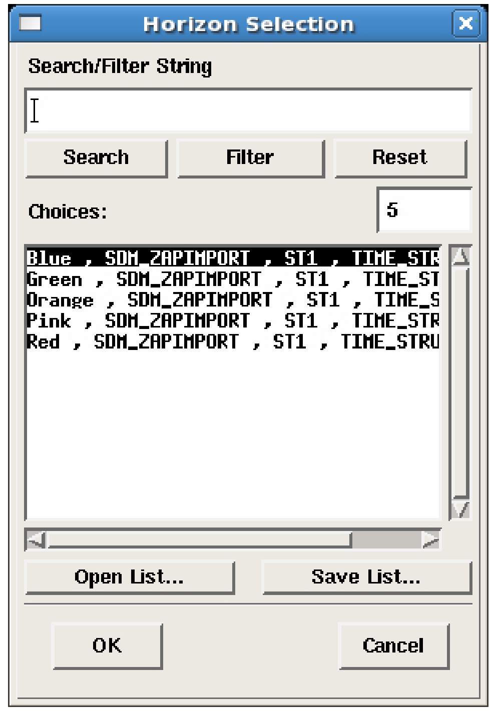
11. Open **Seismic Data Manager** and select the *newfl3d* 3D survey. Click the **Horizons** tab. The five horizons you just imported should be there. Keep this window open for the Pack & Go portion of the exercise.



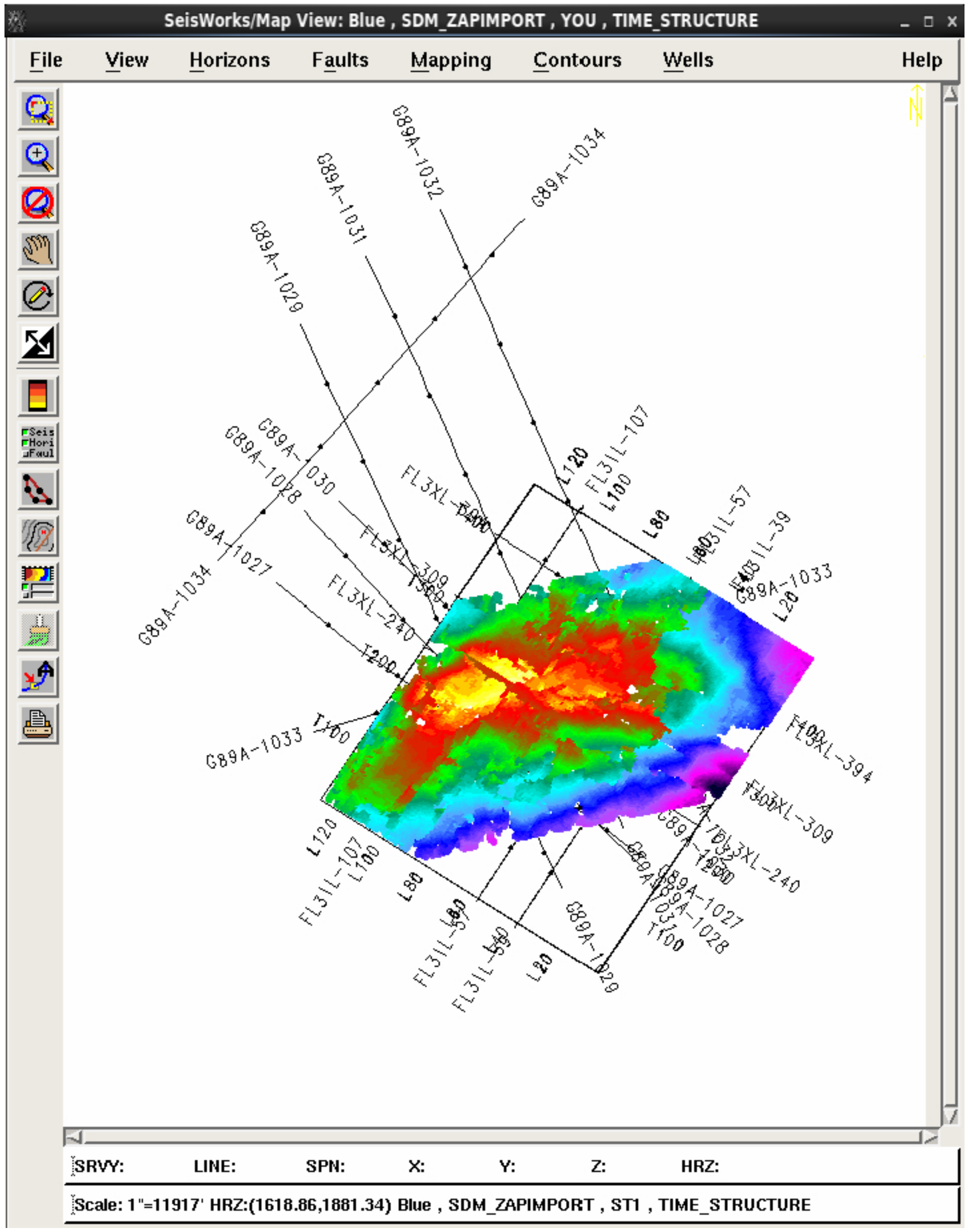
To view the horizons in SeisWorks, in a Map View select the contents icon ().



In the bottom (Horizons) portion of the dialog click **List…** to select a horizon. Make sure it is toggled **ON** and click **Apply**.



The horizon displays in Map View:

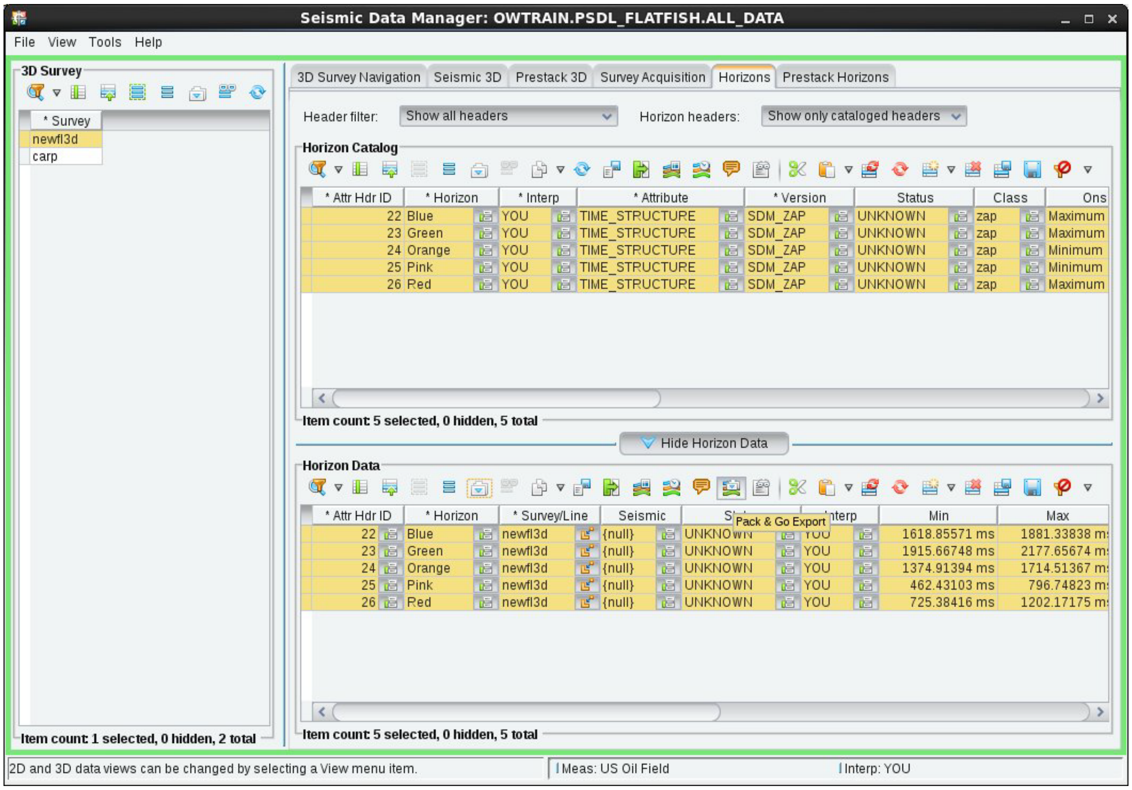


The next part of the exercise uses Pack & Go Export to create another type of export file for these horizons.

Part 2: Pack & Go Export

To export data from Seismic Data Manager:

1. To select the data for export, in Seismic Data Manager, highlight the all the horizon headers in the Horizon Catalog (in the upper right pane), and highlight all the Horizon Data in the bottom right pane.



2. Click the **Pack & Go Export** toolbar button ( ) above the table where you selected the data.

Use the defaults for this export, but you can select a different export directory with the following steps:

- Click the **Browse** button (**…**) next to the *Export to directory* text box. The *Select Export Directory* dialog box displays.
- Select or create a directory where the exported files will be stored.
- Click **Select Directory**. The *Select Export Directory* dialog box closes, and the path name of the directory you selected displays in the **Export to directory** text box.

By default Pack & Go Export option is set to **Create a list of files for copying later**.

If you select *Create a list of files for copying later*, the following files are created:

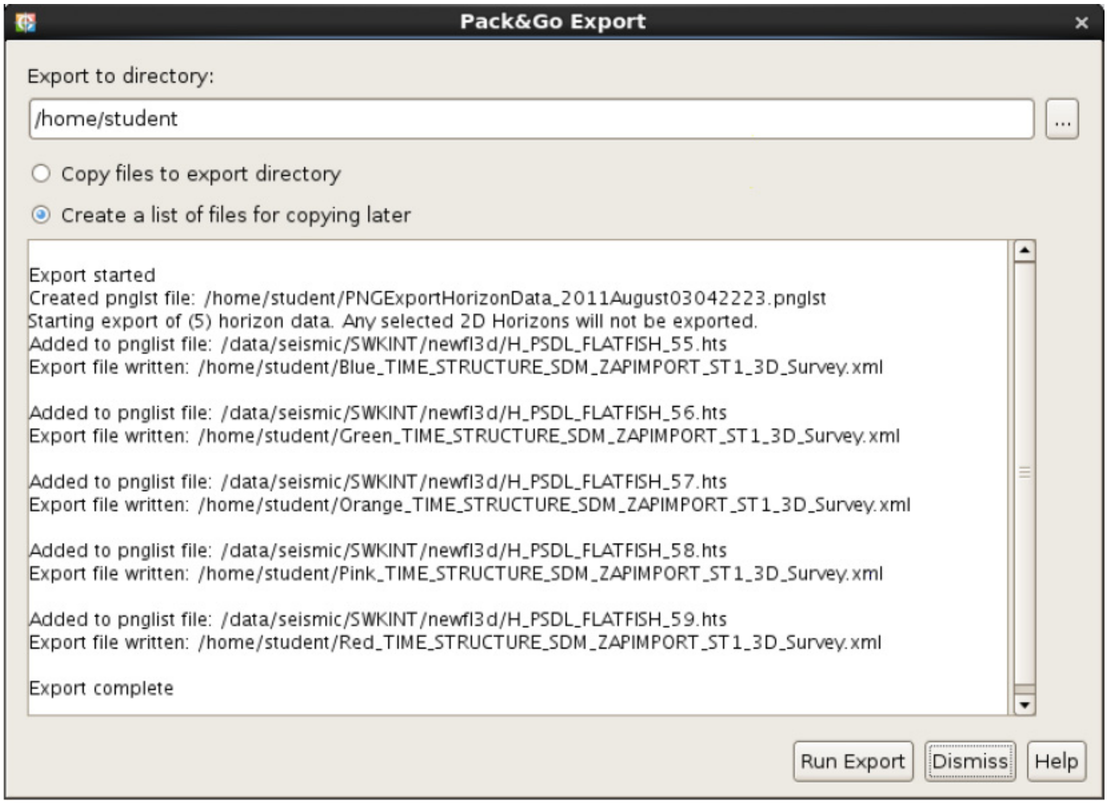
- *pnglst* file: one file which contains the original path name of each data file associated with the chosen data items
- *xml* files: one file for each data item selected for export containing metadata about the item

If you select *Copy files to export directory*, the same files are created but with the following differences:

- *xml* files: pathnames recorded for the xml file data files reflect you selected in the *Export to Directory - Select Directory* option
- *Other* files: data files described in the xml files are copied to the location selected in the *Export to Directory - Select Directory* option

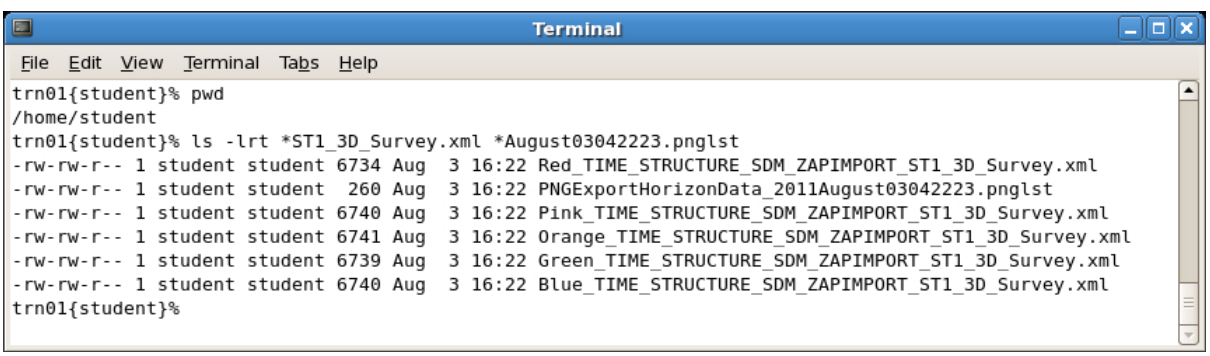
Select a radio button to determine whether the Export tool should copy the data files to the export directory. Your selection depends on whether the directories where the external files are located are accessible when you import the data into another project database with Pack & Go Import.

3. Click **Run Export**.



4. Click **Dismiss** to close the *Pack & Go Export* dialog box.

The files generated are shown below.

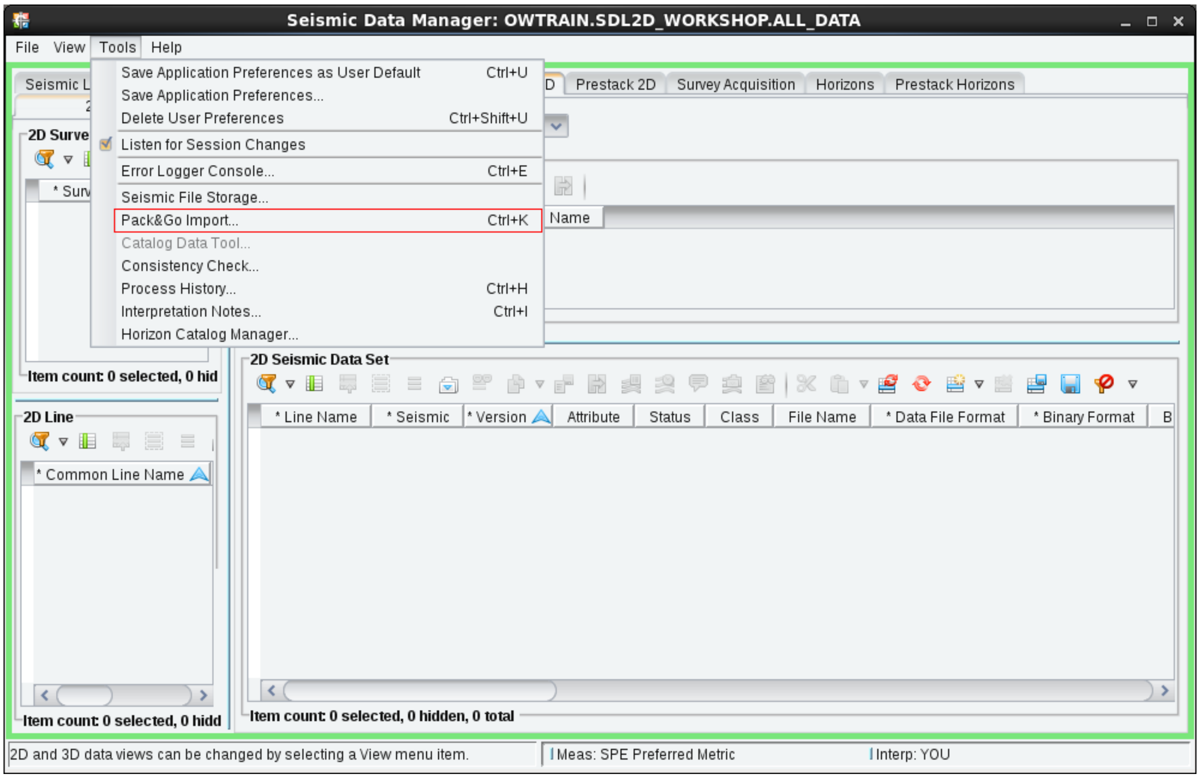


EXERCISE 4: Pack & Go Import - 3D Horizons

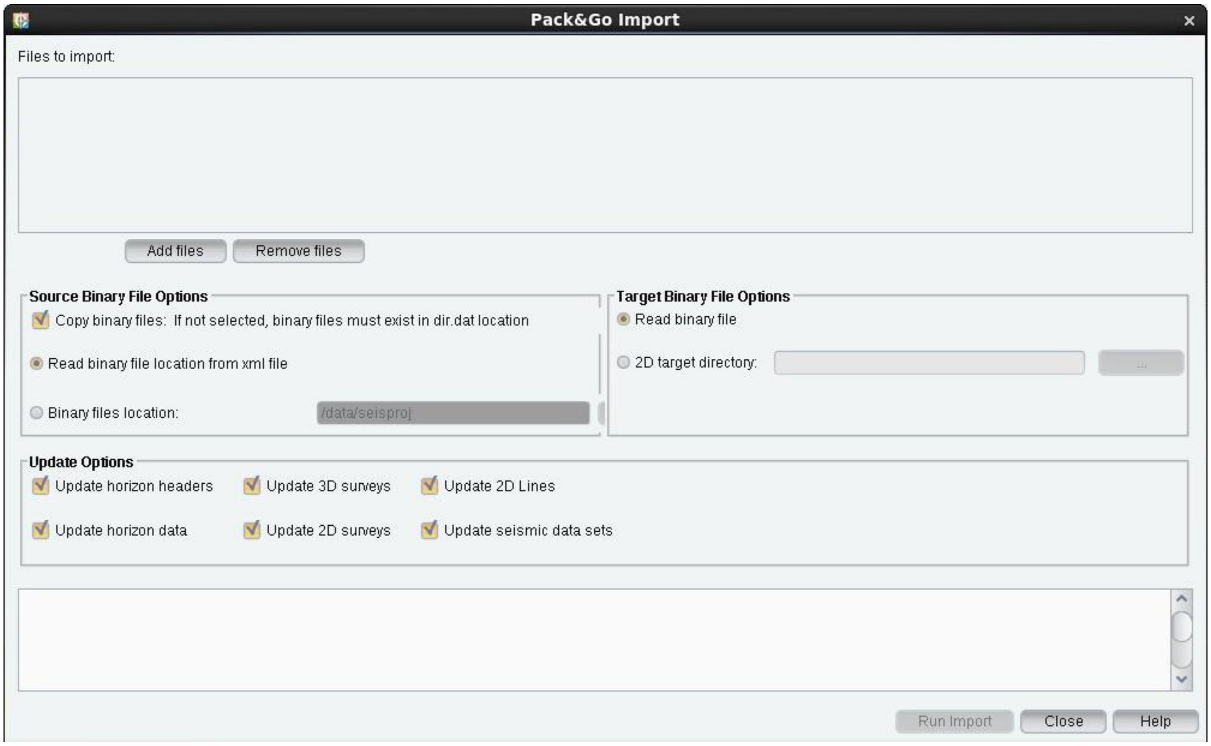
This exercise uses the Pack & Go Export files to import into another project database.

1. Use Project Status Tool to select SDL2D_WORKSHOP project database, and set your Interpreter ID.

2. Open Seismic Data Manager (from the OpenWorks command menu select **Data > Management > Seismic Data Manager**).



3. Select **Tools** > **Pack & Go Import…** from the main menu.

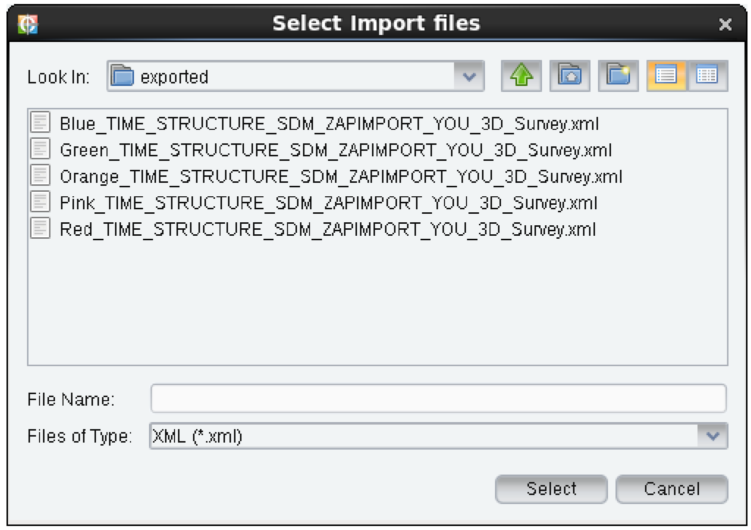


4. Click **Add files** to import the following files into the SDL2D_WORKSHOP project database:

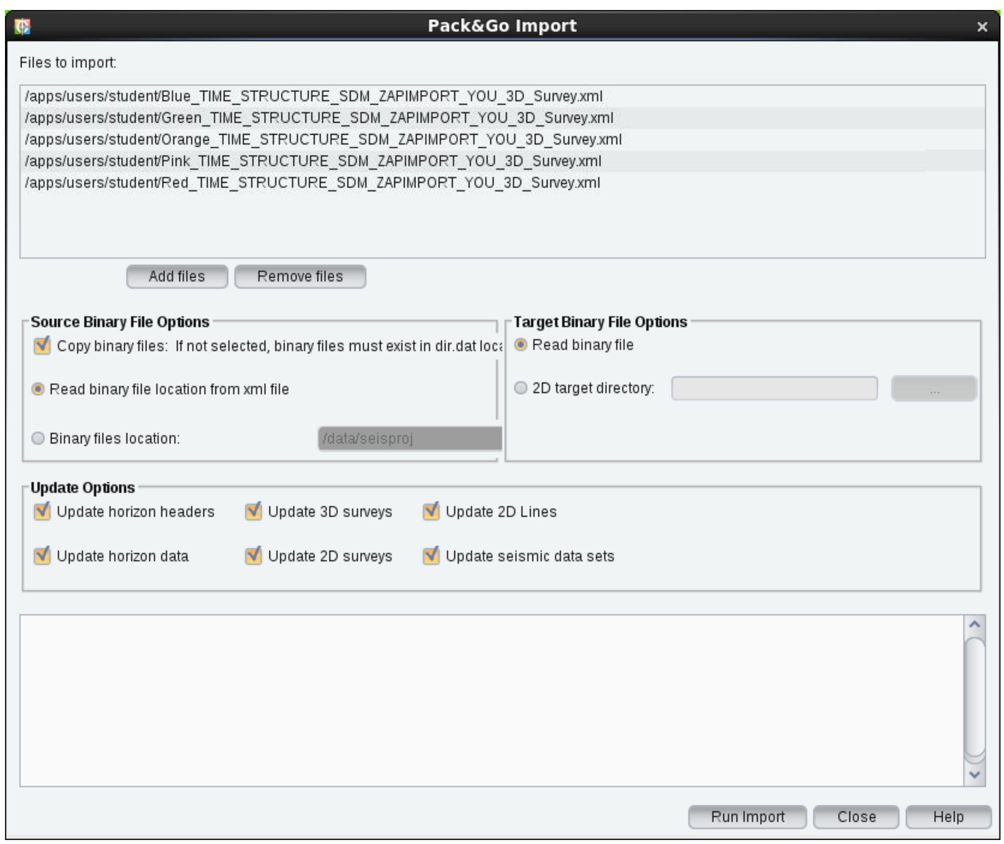
   - "Red_TIME_STRUCTURE_SDM_ZAPIMPORT_ST1_3D_Survey.xml
   - "Pink_TIME_STRUCTURE_SDM_ZAPIMPORT_ST1_3D_Survey.xml
   - "Orange_TIME_STRUCTURE_SDM_ZAPIMPORT_ST1_3D_Survey.xml
   - "Green_TIME_STRUCTURE_SDM_ZAPIMPORT_ST1_3D_Survey.xml
   - "Blue_TIME_STRUCTURE_SDM_ZAPIMPORT_ST1_3D_Survey.xml

   To select more than one file with the mouse, hold down the *Shift* key to select a contiguous list of files, or hold down the *Ctrl* key to select a non-contiguous list of files.

The file location should be in your home directory or the directory you specified for export.



5. Click **Select**.



Selecting files from other locations: The *Select Import Files* dialog box allows you to select files in only one folder. If you have files you want to select from more than one folder, repeat the selection steps (starting with **Add files**) for each folder.

Determine whether the external files should be copied from their current location. For an OpenWorks project to access seismic data in external files, the data must be within a subfolder in a folder defined by the dir.dat configuration file and a configuration in the seismic survey.

In **Binary File Options**, choose from the following options:

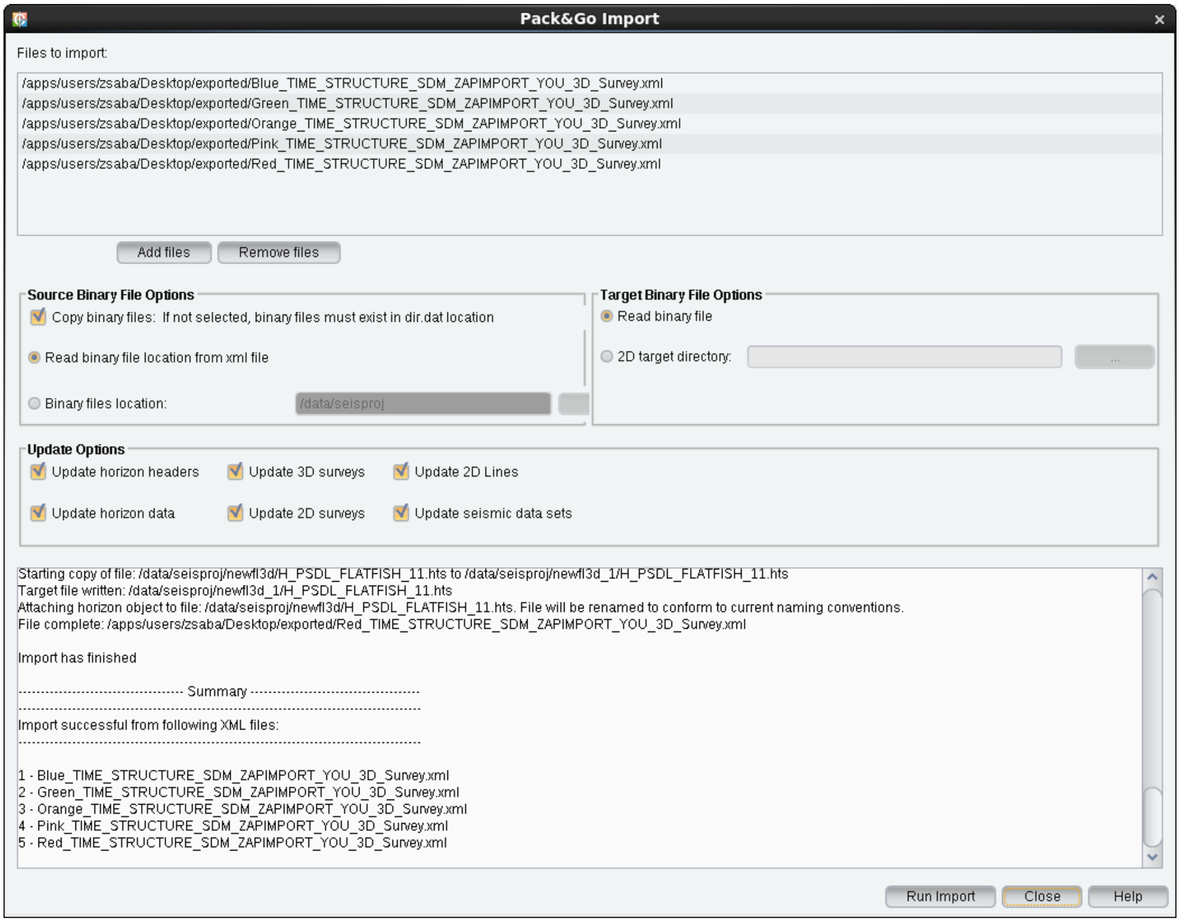
- If the external file is found at the path name configured in the XML file, select the **Read from xml file** radio button.
- If the path in the in the xml file should be overridden:
  - — Select the **Read from location** radio button.
  - — Click the **Browse** button (…) next to the Read from location text box. The *Select Directory* dialog box displays.
  - — Select the name of the folder where the files are located.
  - — Click the **Select Directory** button. The path name of the folder appears in the text box.

In the **Update Options** group box, check the data types which the importing data should update. Depending on whether the data being imported has the same keys as data already in the project, checking a data type will have the following effects:

- **Data with the Same Identifiers in the Project:** Check the box for a data type for SDM to replace the data already in the project with the imported data. Uncheck the box for SDM to leave the data in the project as is.
- **Data Not Already in the Project:** Checking or not checking a box for the data type will have no effect on whether the data is imported. The new data will be imported into the project.

6. In this exercise, default the **Update** options.

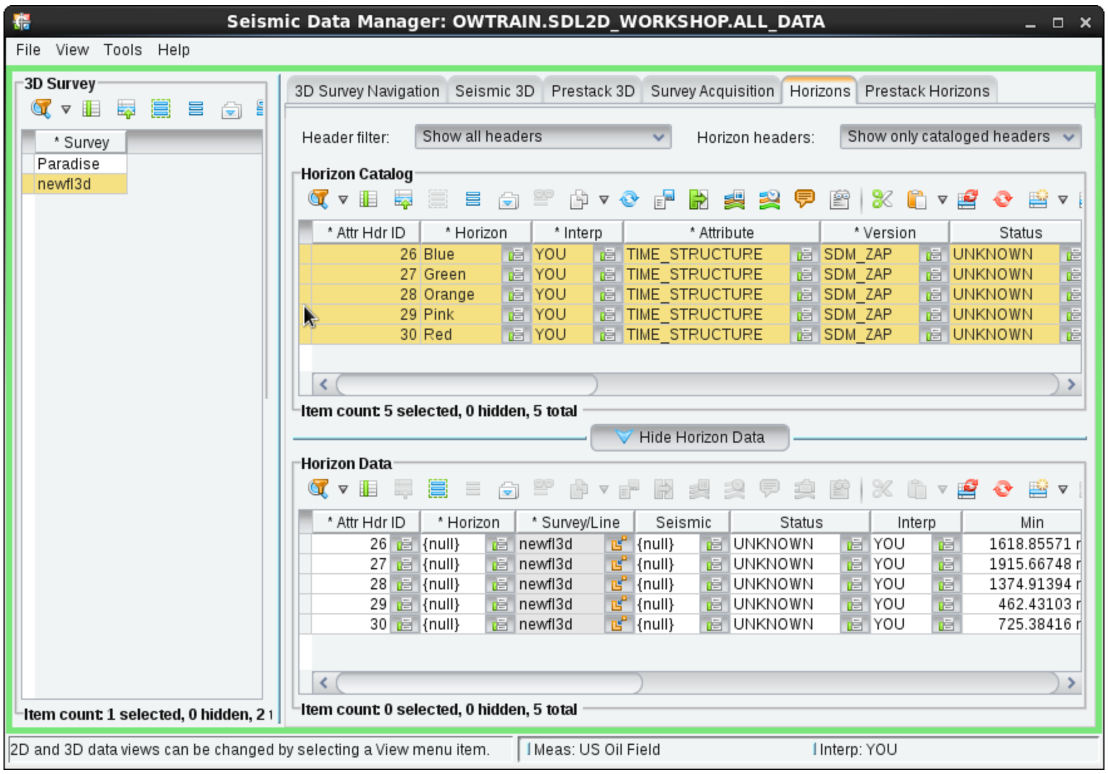
7. Click **Run Import**. Messages will appear in the lower text box, indicating the progress status.



8. When the import is complete, click **Dismiss** (or **Close** for newer releases) to close the *Pack & Go Import* dialog box.

Check the imported horizon data

1. Under the SDL2D_WORKSHOP project, select **Seismic Data Manager**, open the 3D view, highlight the 3D survey and click the Horizons tab.

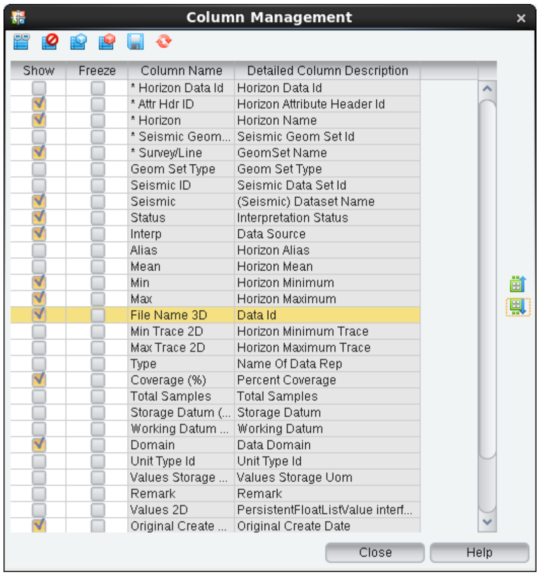


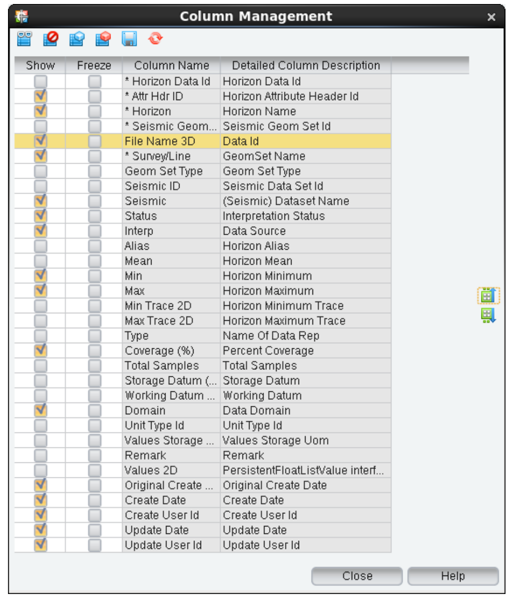
Review: Select columns ( )

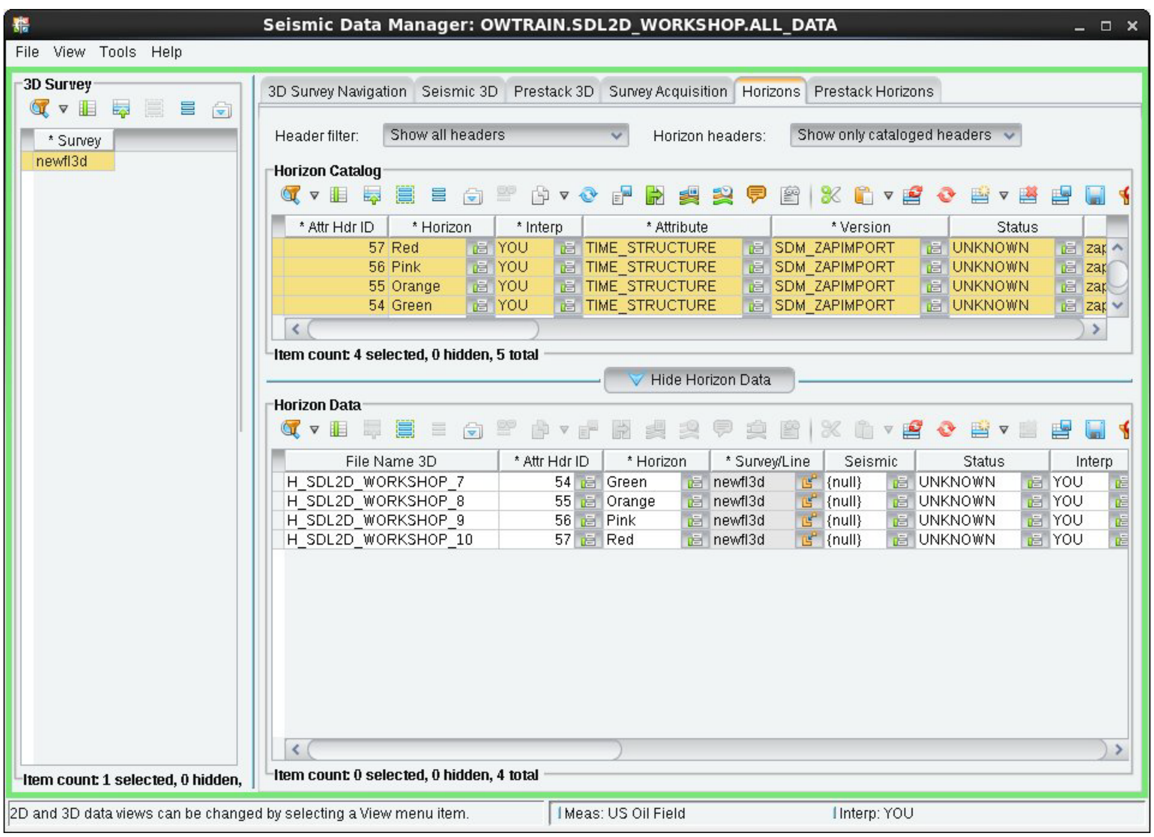
The Select Column toolbar button allows you to show or hide columns that are available in a record. It also allows you to reorder the columns and freeze columns. Freezing columns keeps the columns on the left side of the table as you scroll the other table columns to the right; when you click the Select Column toolbar button, the *Column Management* dialog box displays.

2. Click the *Select columns* icon ( ) in the Horizon Data pane.

3. Check Show **File Name** 3D in column name and move the selected row to the top.



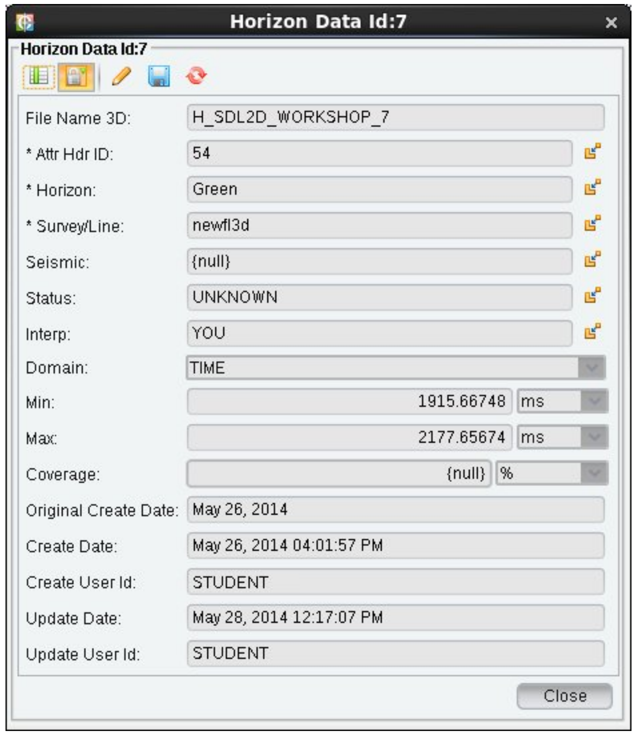




The **File Name 3D** listed in SDM is the same name as the UNIX file name.

Another viewing option - table display

The columns of a row in a table display as a form when you select a row in a table and click the Open Row in Form View toolbar button ( ). A dialog similar to the following displays:



Display the data in WOW

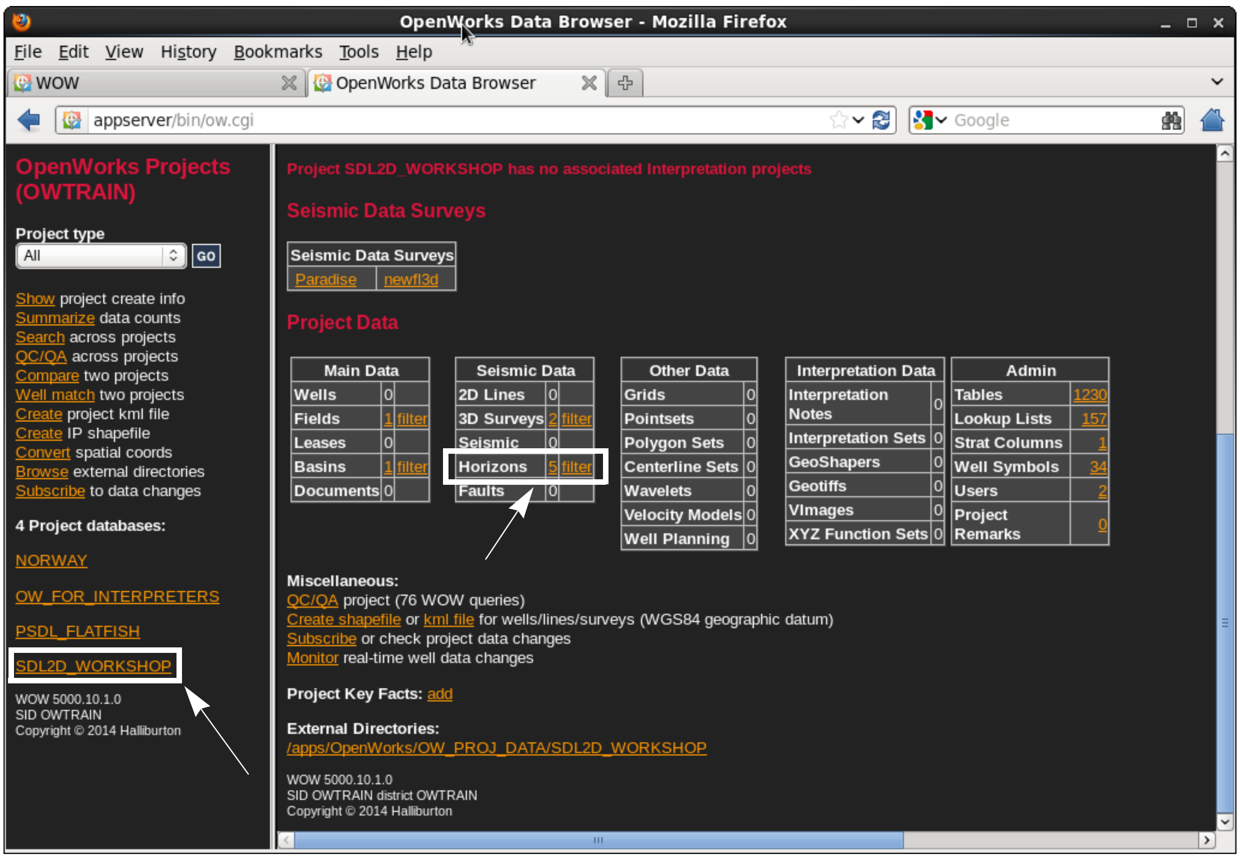
Previously you have used SeisWorks to check the horizon imported with Mltimp. This exercise uses WOW.

Steps to select horizons data to view in WOW:

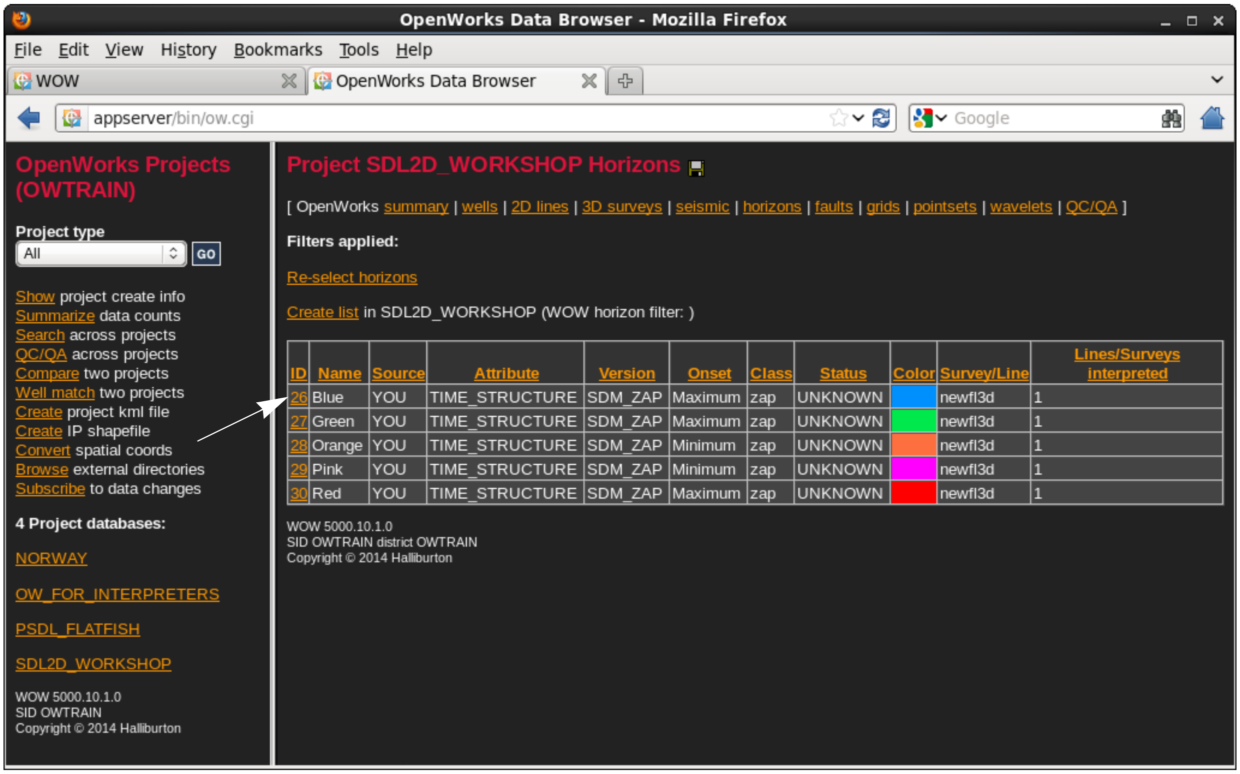
1. Do the following:

   Click **SDL2D_WORKSHOP** under **Project Databases**

   Click the number **5** (adjacent to Horizons) under **Seismic Data**:

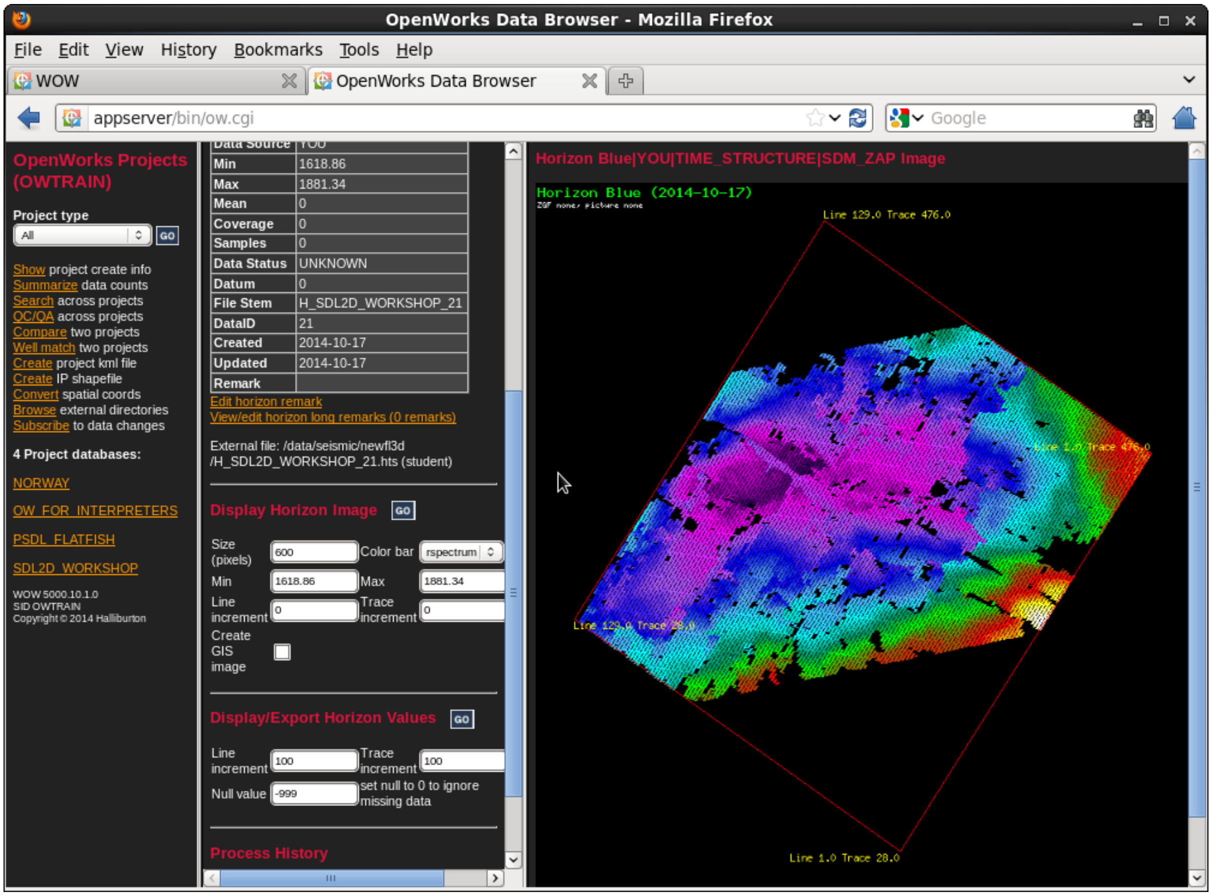


2. Click the ID number for the Blue horizon.



3. Scroll down to Display Horizon Image in the middle pane.

4. Click **GO**.


OpenWorks Data Browser - Mozilla Firefox
File Edit View History Bookmarks Tools Help
WOW
OpenWorks Data Browser
appserver/bin/ow.cgi
Google
OpenWorks Projects (OWTRAIN)
Project type
All
GO
Show project create info
Summarize data counts
Search across projects
QC/QA across projects
Compare two projects
Well match two projects
Create project kml file
Create IP shapefile
Convert spatial coords
Browse external directories
Subscribe to data changes
4 Project databases:
NORWAY
OW_FOR_INTERPRETERS
PSDL_FLATFISH
SDL2D_WORKSHOP
WOW 5000.10.1.0
SID OWTRAIN
Copyright © 2014 Halliburton
Min 1618.86
Max 1881.34
Mean 0
Coverage 0
Samples 0
Data Status UNKNOWN
Datum 0
File Stem H_SDL2D_WORKSHOP_21
DataID 21
Created 2014-10-17
Updated 2014-10-17
Remark
Edit horizon remark
View/edit horizon long remarks (0 remarks)
External file: /data/seismic/newfl3d /H_SDL2D_WORKSHOP_21.hts (student)
Display Horizon Image
Size (pixels) 600
Color bar rspectrum
Min 1618.86
Max 1881.34
Line increment 0
Trace increment 0
Create GIS image
Display/Export Horizon Values
Line increment 100
Trace increment 100
Null value -999
set null to 0 to ignore missing data
Process History
Horizon Blue|YOU|TIME_STRUCTURE|SDM_ZAP Image
Horizon Blue (2014-10-17)
Line 129.0 Trace 476.0
Line 1.0 Trace 476.0
Line 129.0 Trace 28.0
Line 1.0 Trace 28.0

Exercise: Seismic File Storage Tool

You have used the *Seismic File Storage* tool in the data loading portion of this class to create storage directories and locate seismic data. This tool also provides an easy way to find the location of seismic and 3D horizon files, which may span across several directories, depending on how the dir.dat and storage areas are defined at your location.

In this exercise you will find the seismic file storage location for seismic volumes for a 3D survey and 2D lines.

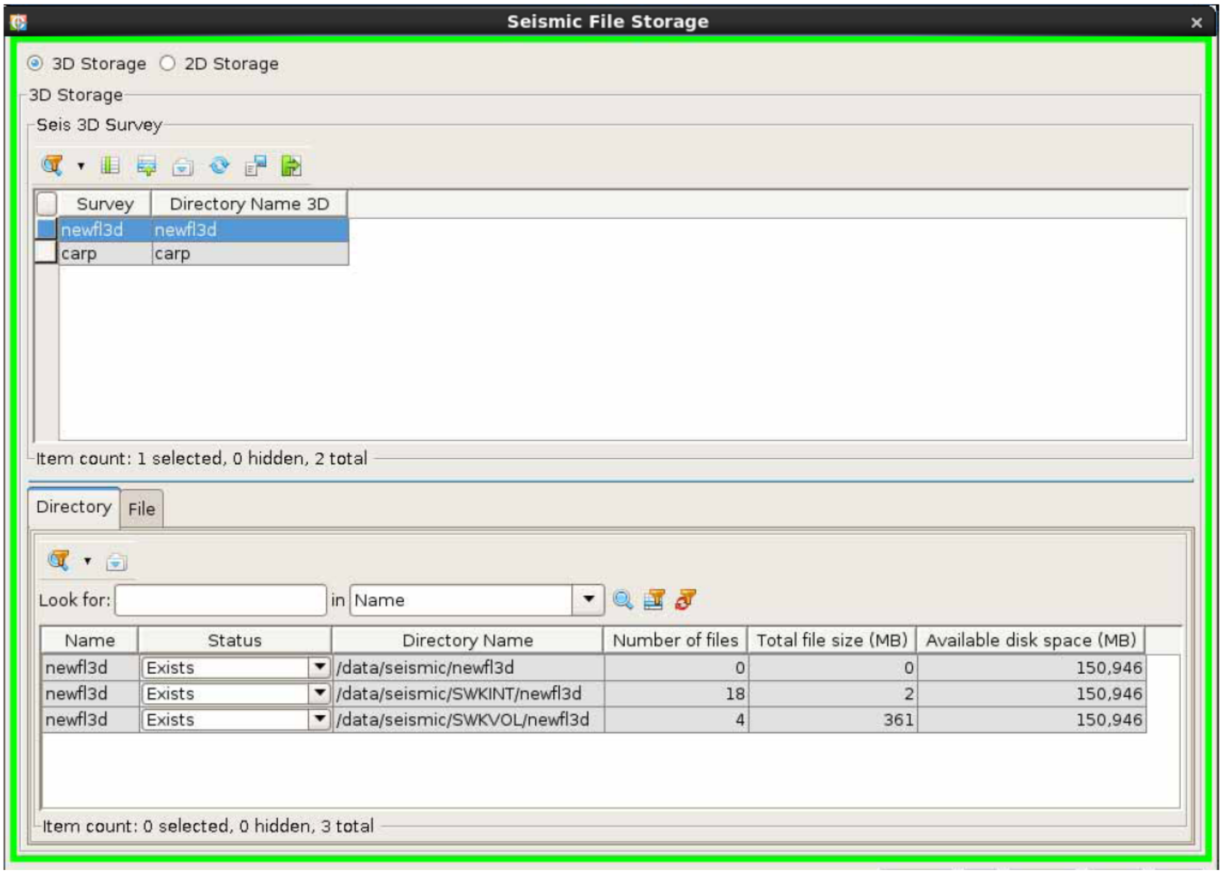
EXERCISE 5: Locating Seismic Files using Seismic File Storage Tool

1. Use Project Status Tool to select the PSDL_FLATFISH project database, and set your Interpreter ID.

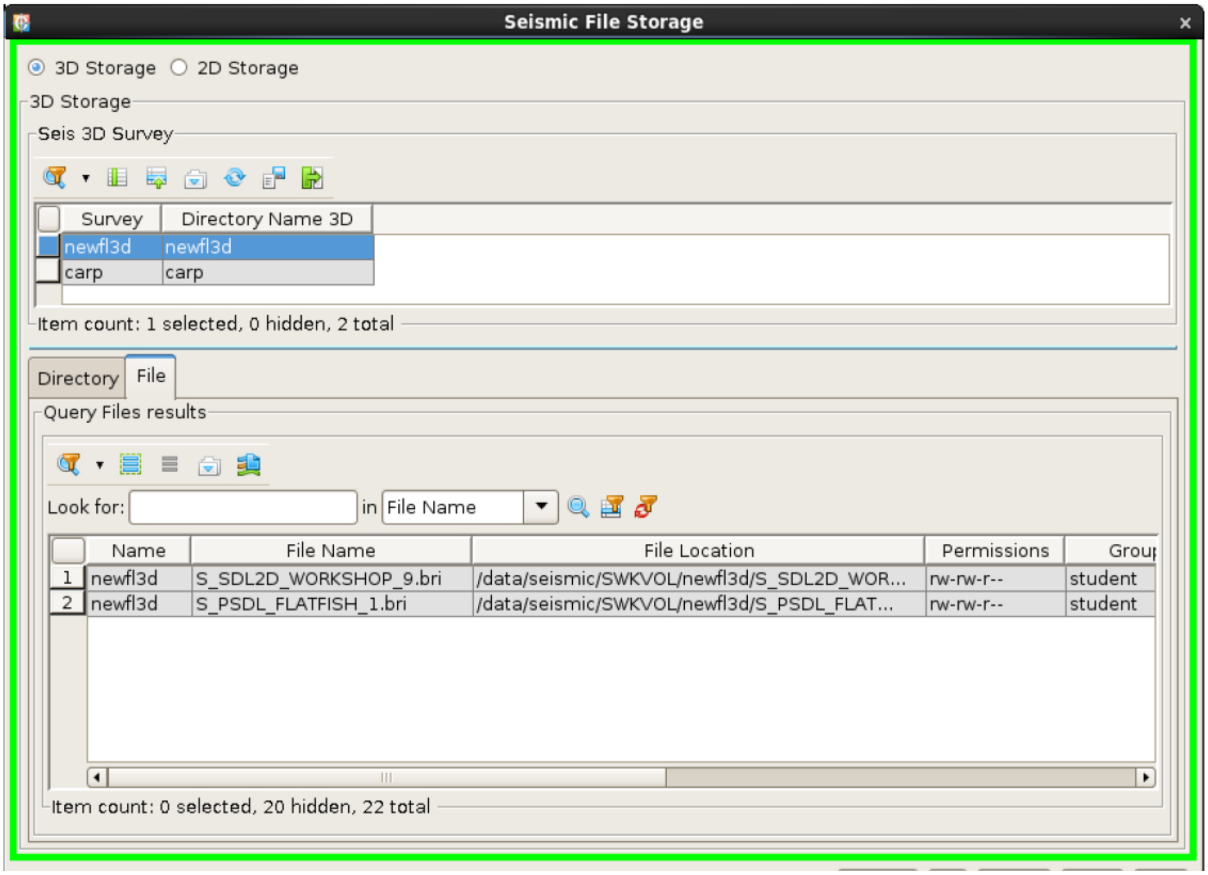
2. In Seismic Data Manager, select **Tools > Seismic File Storage…**. The *Seismic File Storage* dialog displays.

3. Set the type of storage area to **3D Storage** using the radio button.

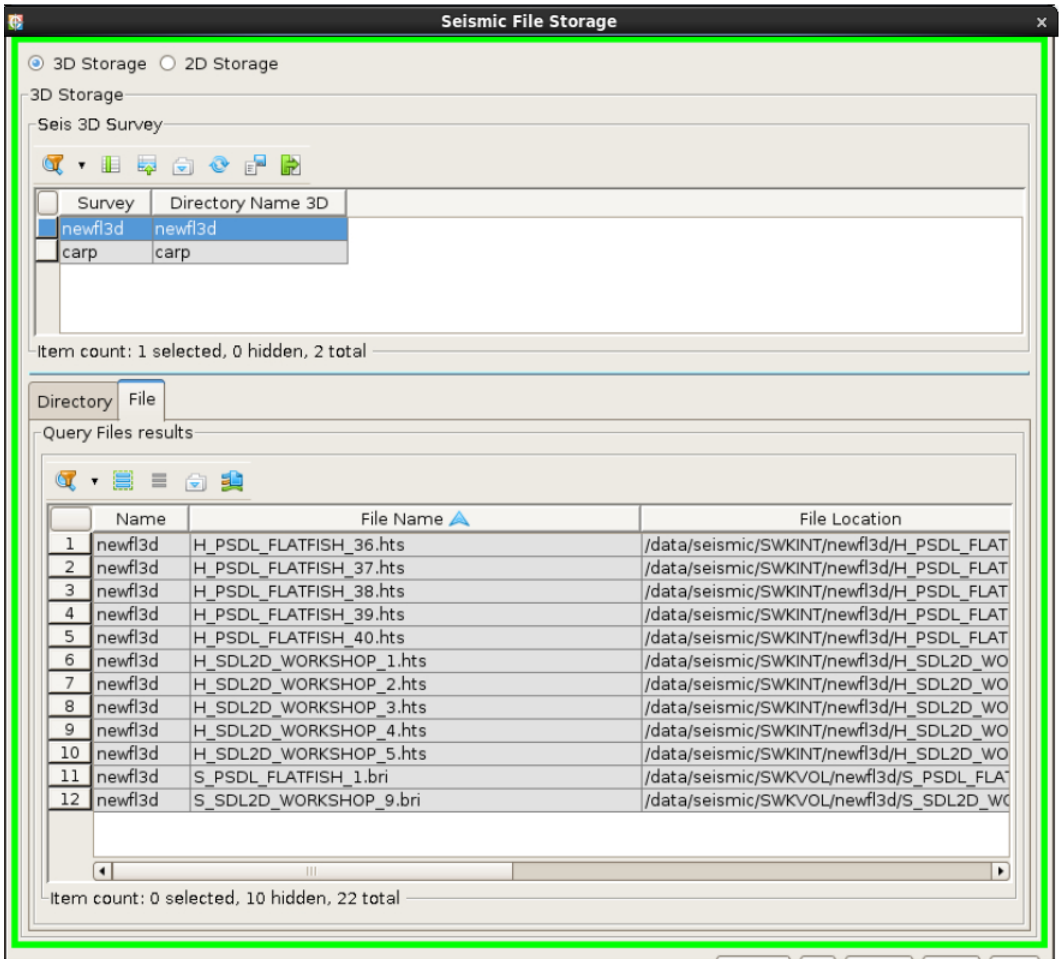
4. Highlight the name of a survey (*newfl3d*) or storage area in the upper pane.



5. Select the **File** tab in the lower pane. A list of the files in that storage area will display in the Query Files Results table.

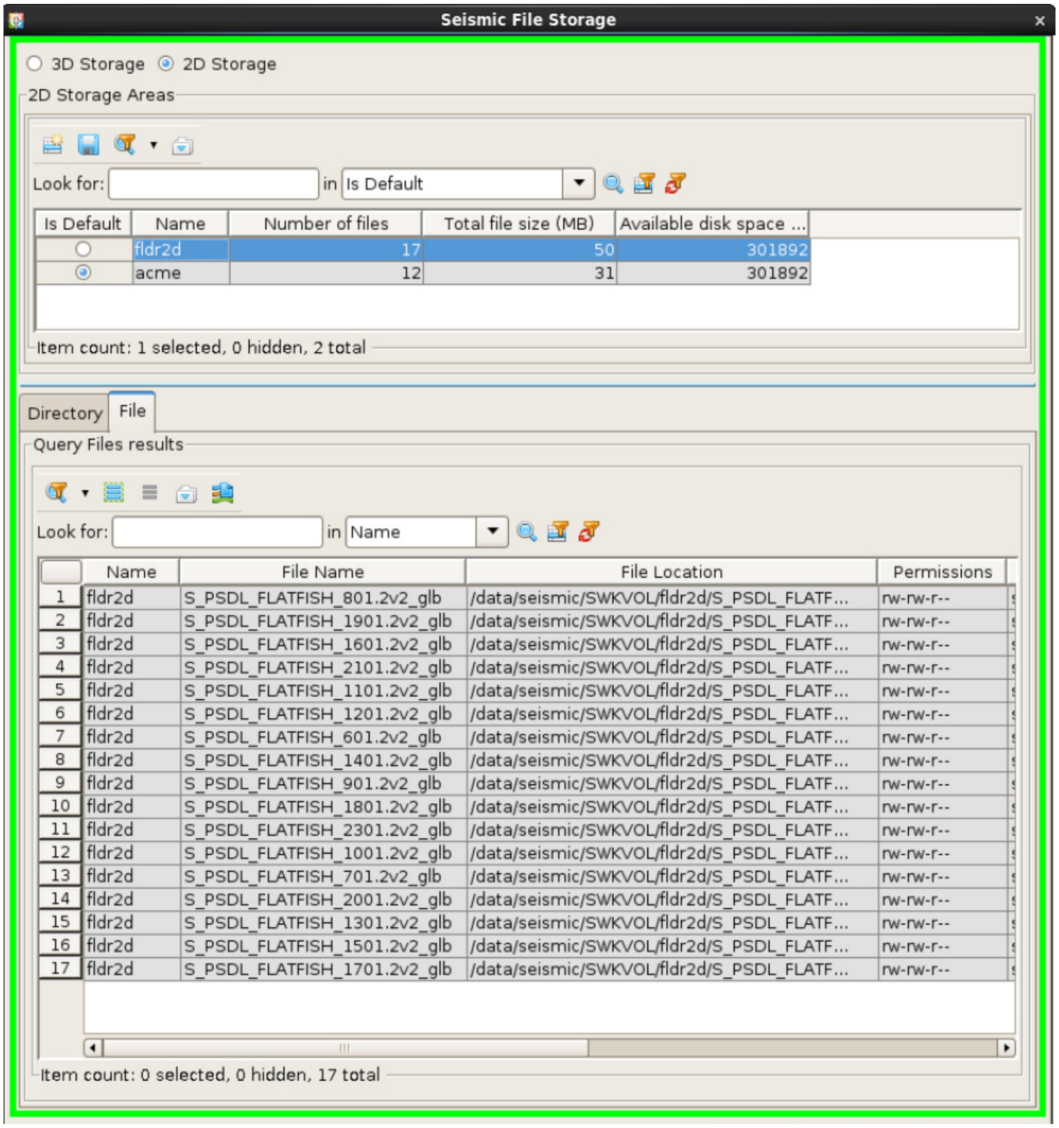


If you did not do the workshop, you will only see one volume. If you had 3D horizon data, it would show up here as well. An example is shown below.



6. To check the location for the 2D line volumes, toggle the **2D Storage** radio button.

7. Select *fldr2d* and click the **File** tab. A list of the files in that storage area will display in the Query Files Results table.



Exercise: Using the Consistency Check Tool

The Consistency Check tool is a utility in Seismic Data Manager that allows you to check whether the OpenWorks software can access external files cataloged in a project.

The tool can check for the external files of one or all of the following data types:

- 2D seismic data sets
- 3D seismic data sets
- 3D horizons

After checking for the existence of the files, it will display the results in the *Consistency Check* dialog box and will record the results in a file with a path name similar to the following:

Dir/DataType_ddMMMyy_hhmmss.txt

Where *Dir* is the directory where the results are stored. By default the directory is your home directory.

Data Type is Seismic2DFileChecker, Seismic3DDataFileChecker, or HorizonFilesExist.

ddMMMyy is the date the check was done (dd is the day, MMM is the month, and *yy* is the year).

hhmmss is the time the check was done (*hh* is hours in 24-hour notation, *mm* is minutes, and *ss* is seconds).

EXERCISE 6: Using the Consistency Check Tool

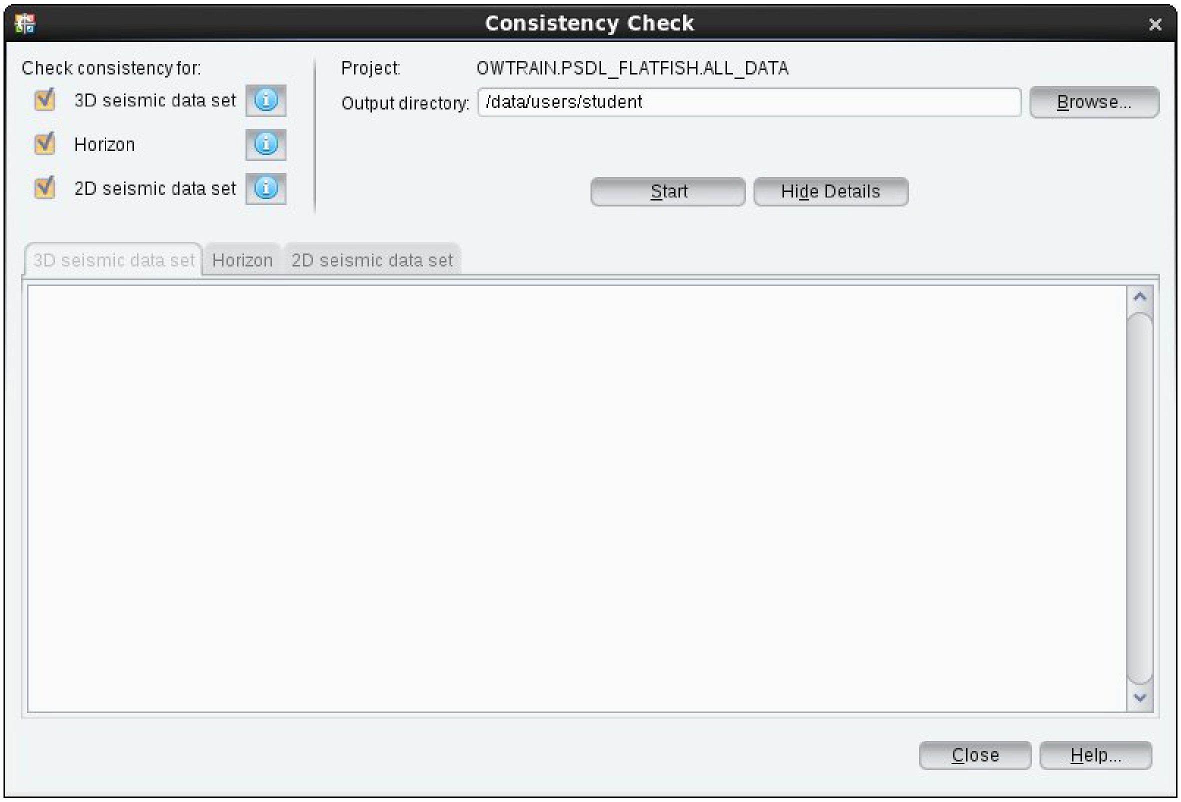
The OpenWorks project to use for this exercise is *PSDL_FLATFISH*.

1. In the Seismic Data Manager, select **Tools > Consistency Check**.

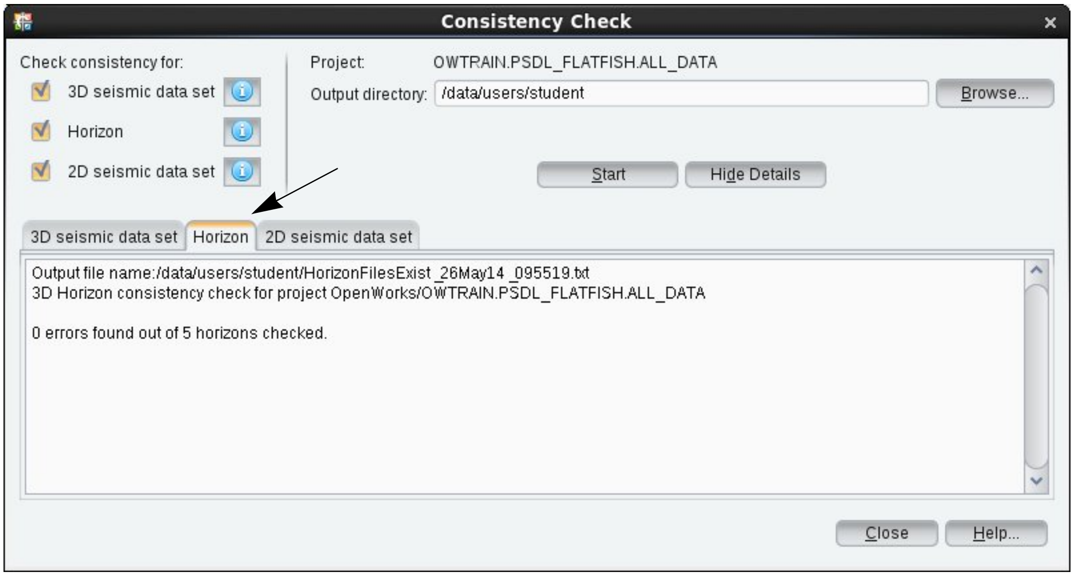
2. In the **Consistency Check Process** group box, check each data type for which you want to check the existence of external files.

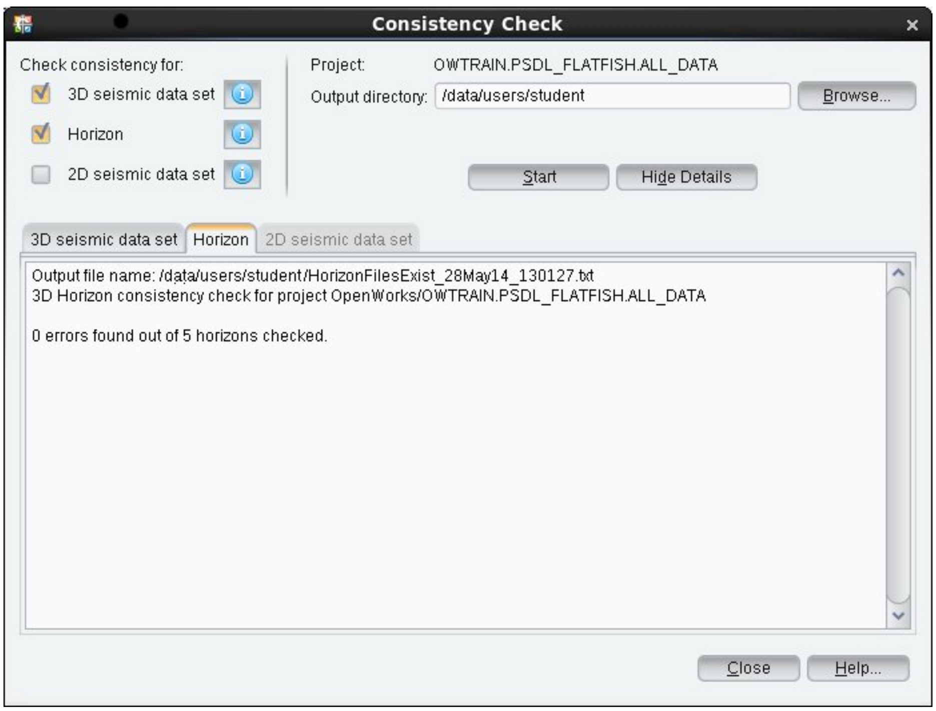
3. Select a location for the output directory (defaults to user's home directory) if a different location is desired. Results of the tool are displayed in the dialog and written to file in this directory.

4. Click **Start**.



5. After the tool is finished, check each of the tabs in the dialog to see if any errors occurred.





6. Click **Close**.

7. If errors occurred you may need to find the missing files and place them where they should be, as defined by the dir.dat configuration file and the Seismic File Storage tool, or you may need to open the Seismic File Storage tool to correct the path.

Once you close the tool, the results of the consistency check can be viewed in a terminal window. Navigate (cd) to the location then type `more <filename>`.

Filenames use the following structure:

OutputDirectory/DataType_dd_MMMyy_hhmmss.txt

where *DataType* is:

- Seismic2DFile Checker
- Seismic3DFileChecker
- HorizonFilesExist

ddMMMyy is day, month, year

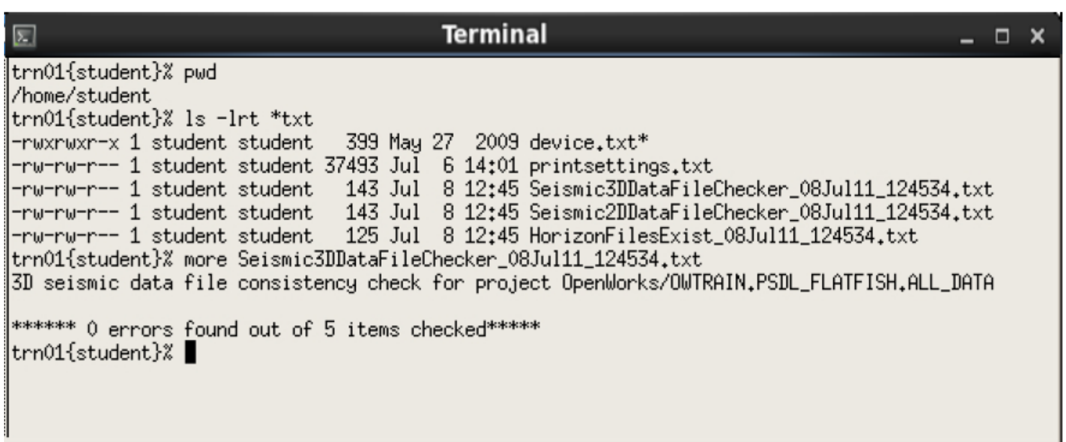
hhmmss is hours (24 hour notation), minutes, seconds

Optional: Navigate to the file location and view the information for one or more of the files.

8. Open a terminal window (**OpenWorks command menu > System Terminal Window**)

9. Type `ls -lrt` to list the files (the latest ones will be last)

10. Type `more <filename>` to view the file



Exercise: Using the Process History Tool

The Process History Tool allows you view and manage processes and process history for various data types stored in the database. The OpenWorks instance can store process history data for seismic data, horizons, and fault planes.

Some applications that create process history:

- PostStack
- SeisWorks horizon computations
- ZAP!
- Power Calculator
- PowerView ezTracker, Interpolate, Copy
- DecisionSpace Geosciences Desktop horizon domain conversion

The Process History tool also allows you to create process history that may be missing, because an application may not create process history (such as data from Pack & Go Import or SEG Y Import), or because it does not store process history in the OpenWorks instance.

A process can have multiple inputs of differing data formats and multiple parameters that control the process. A process can produce multiple outputs of various data formats. The Process History tool allows you to view information about the data inputs and outputs, the processes, and the parameters of the process as well as view notes about the process. A process can be viewed as a graphical representation or in a detailed view in a table format.

Launching the Process History Tool

Toolbar: The toolbars for various data types have icons which allow you to show process information for particular data selected in Seismic Data Manager: 2D and 3D seismic data sets, 2D and 3D prestack data sets, and horizons (catalog and data).

To view the processing history data:

- Select **View > 2D or 3D**.
- Select a tab containing a data type with processing history (Seismic 2D or 3D, Prestack 2D or 3D, or Horizons).
- Select one or more rows of data.
- Select one of the following toolbar buttons to see the processing history of the data or to see the processing history where the data is an input to a process.
  - — processing history of the selected data
  - — processing history where the selected data is an input to one or more processes
- The Process History window displays.

Duplicate Processes Are Not Allowed

When creating a process, four fields are required: a seismic process type, process name, and a process start and end time. More than one process can have the same type, the same name, or the same type and name, but more than one process is not allowed to have all four cells (or keys) the same (process type, process name, process start time, and process end time).

The lower pane is composed of four sub-panes:

- **Process Details**
- **Process Parameters**
- **Process Input**
- **Process Output**

EXERCISE 7: Viewing the Process History for Seismic Data

The Process History tool can be launched from the menu or from the Process History icon ( ) in various toolbars in Seismic Data Manager.

Launch for the Main Menu:

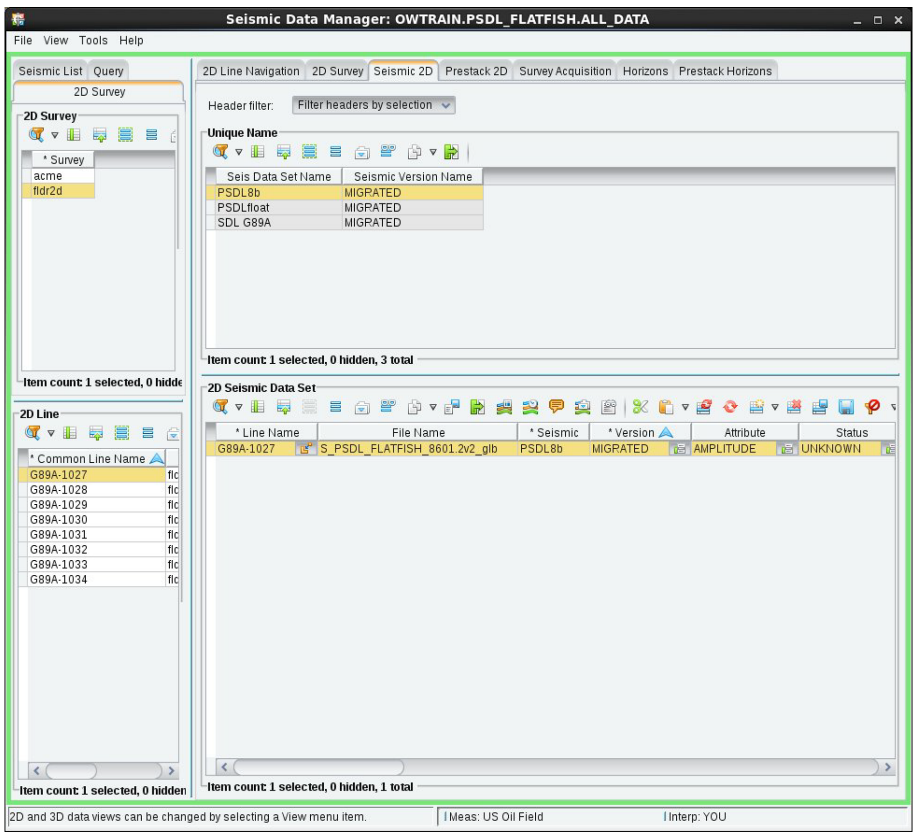
- Select **Tools > Process History…**

Launch form the Icon:

- Highlight a dataset or horizon, then click the Process History icon ( ).

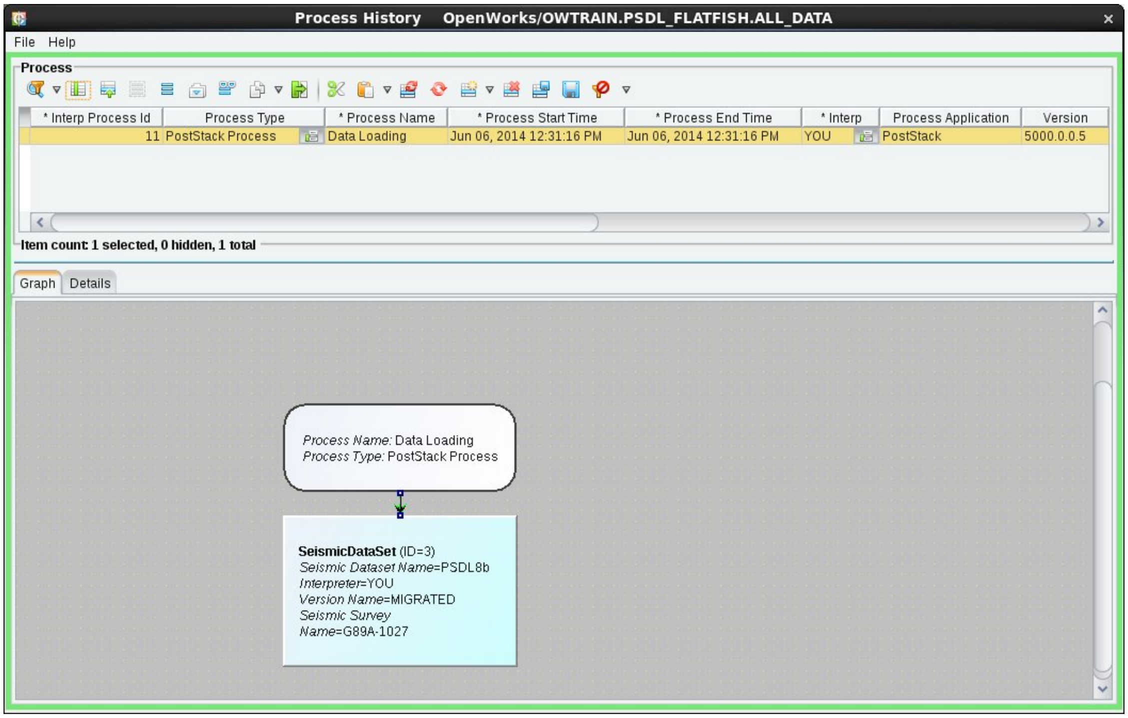
View the process history for one of the seismic data volumes for line G89A-1027.

1. In Seismic Data Manager, select **View > 2D**.
2. Select the **fldr2d** survey.
3. Select **G89A-1027** for the line.
4. Select the **Seismic 2D** tab in the right pane.

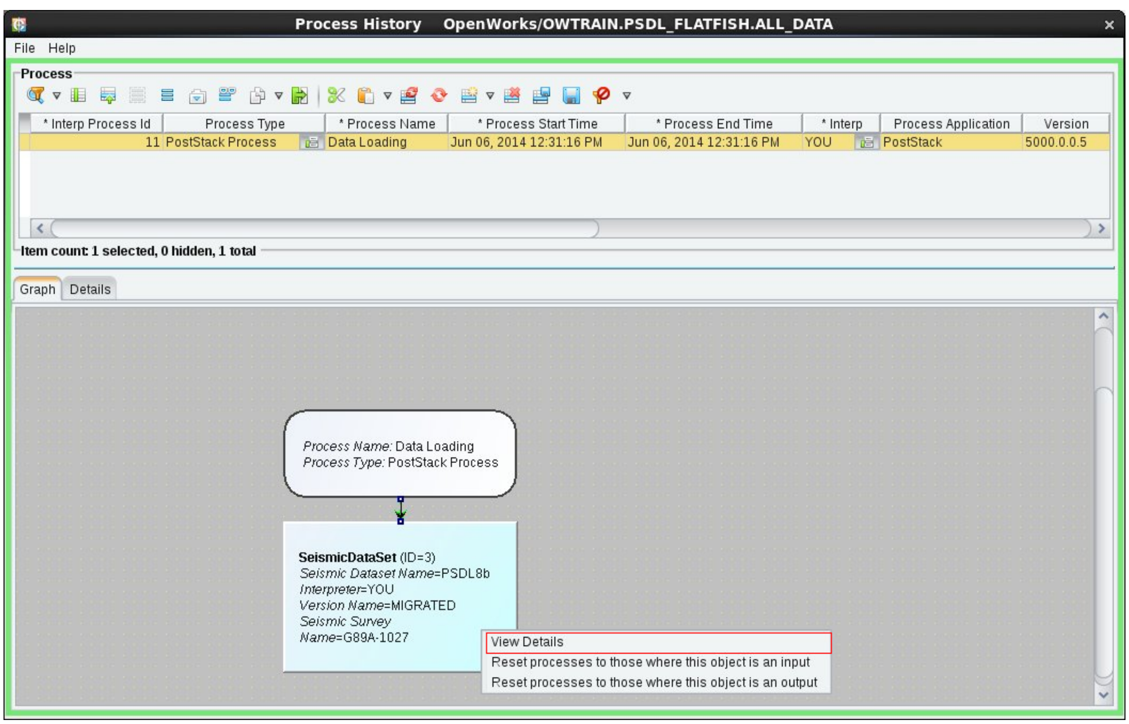


5. Highlight a seismic data set name.
6. In the lower panel, highlight **G89A-1027**.
7. Click the Show process history icon ( ).

The view opens displaying a graph of the process history.



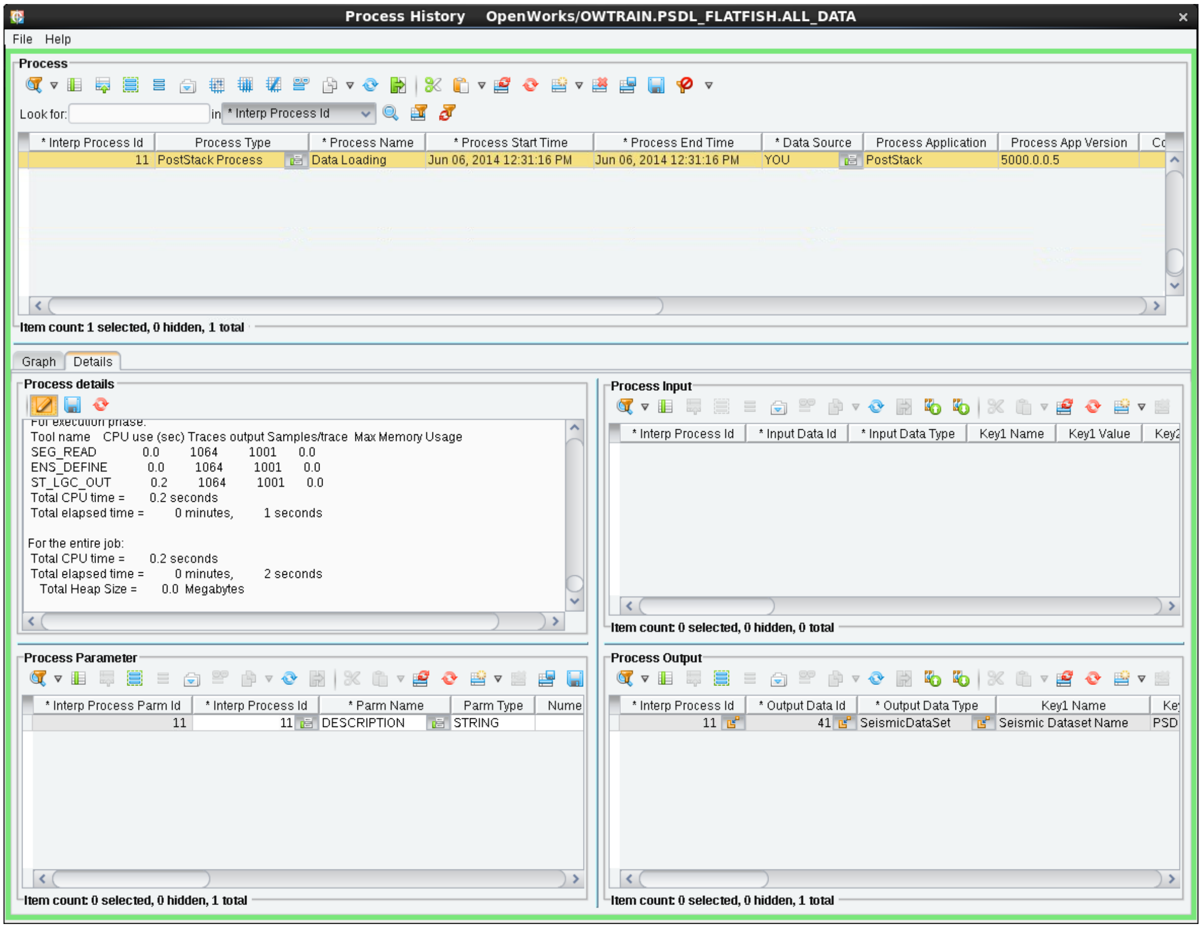
8. To see more information in the graphical view, press **MB3** in the rectangle - a pop-up menu displays.



9. Select **View Details** with **MB1**. A table of detailed information displays for the selected process.

10. Click **Close** when you have looked over the table display.

11. To view the process details in a textural format, click the **Details** tab.



The lower pane is composed of four sub-panes:

- **Process Details** pane: The large text box in this pane allows you to view, enter, or edit the process history. The information that you put in this pane is optional. Click the pencil icon ( ) to edit the information and the Save icon ( ) to save your edits.

- **Process Parameters** pane: This pane allows you to view, enter, or edit the parameters for the process.

- **Process Input** pane: This pane allows you to view, enter, or edit the input data set and type. The available data types are fault plane, horizon attribute headers, horizon data, seismic data set, and seismic prestack data set.

- **Process Output** pane: This pane allows you to view, enter, or edit output data set and type. The available data types are the same as they are for process input.

Enter ( ) and save (or) data in each pane as required by the process.

Process History may also be viewed for a Selected Horizon

Similar to viewing the process history of a seismic volume as you have done numerous times in the data loading portion of this course, you can view the process history of a horizon.

Chapter 7

More OpenWorks Management Tools: Interpretation Projects and Data Transfer

Course Overview

Topics covered in this class include:

- Seismic Line Lists
- Creating and Modifying Interpretation Projects
- Interpretation Data Manager
- SeisWorks Data Transfer
- PDT - Data Transfer
- OpenWorks Backup and Restore
- Create embedded database for local projects
- Copying an Existing Oracle Project with seismic data to an embedded database

This chapter focuses on management tasks that are occasionally required when working with an OpenWorks project. Topics include creation and modification of interpretation projects, transferring data from one project to another, deleting data, and backing up/restoring an OpenWorks project and its associated data.

OpenWorks supports an Embedded DB desktop database (SQLite) as an alternative database platform. OpenWorks Project Admin allows administration of a SQLite database in much the same way it currently manages an Oracle database, all local projects could also be used in DecisionSpace Geosciences software as local offline projects and then synchronize with the enterprise projects. Topics such as creating embedded databases and copying projects or specific data to and from local projects will be covered in this chapter as well.

Seismic Line Lists

Defining Seismic Line Lists

A seismic line list is a subset of the seismic lines in a project. You can create lists containing only those lines that meet specified criteria, and these lists can be used by any application allowing or requiring a seismic line list as an input.

For example, interpretation projects can use line lists to select which 2D lines to access.

You can name and save seismic line lists for repeated use, or you can create unnamed, temporary lists for one-time use.

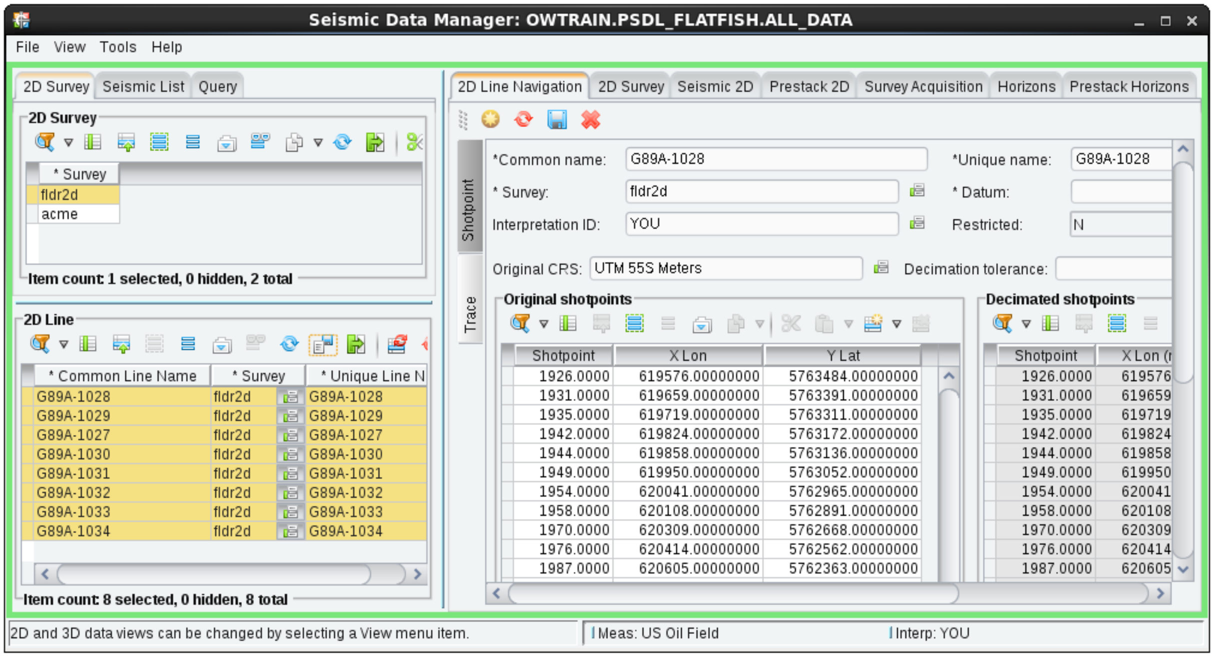
Exercise 1: Creating a 2D Seismic Line List in Seismic Data Manager

2D line lists can be created in the Seismic Data Manager just as Well Lists can be created in the Well Data Manager. You should be working in the **PSDL_FLATFISH** project database.

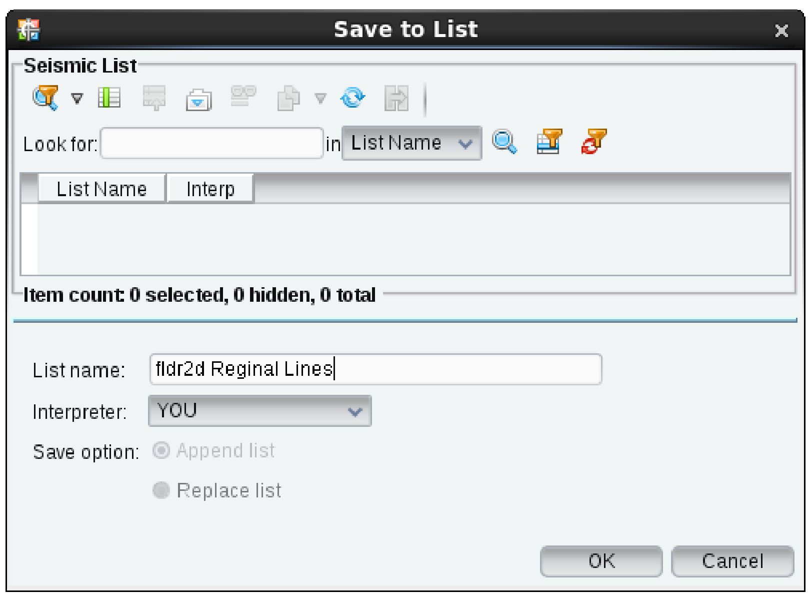
1. In Seismic Data Manager, set the *View* to 2D and select the **fldr2d** 2D survey. Make sure *2D Line Navigation* tab is selected.

2. Click the **Select All** icon ( ) in the 2D Line box at the bottom left hand pane.

3. Click the Export current selection to Seismic List icon ( ).



4. In the Create Seismic List box, type `fldr2d Regional Lines` as the name.



5. Click **OK**.

Once the seismic line list has been created, it can be used by any other application allowing or requiring a line list as an input. The same type of list can be created in Seismic Line List Manager.

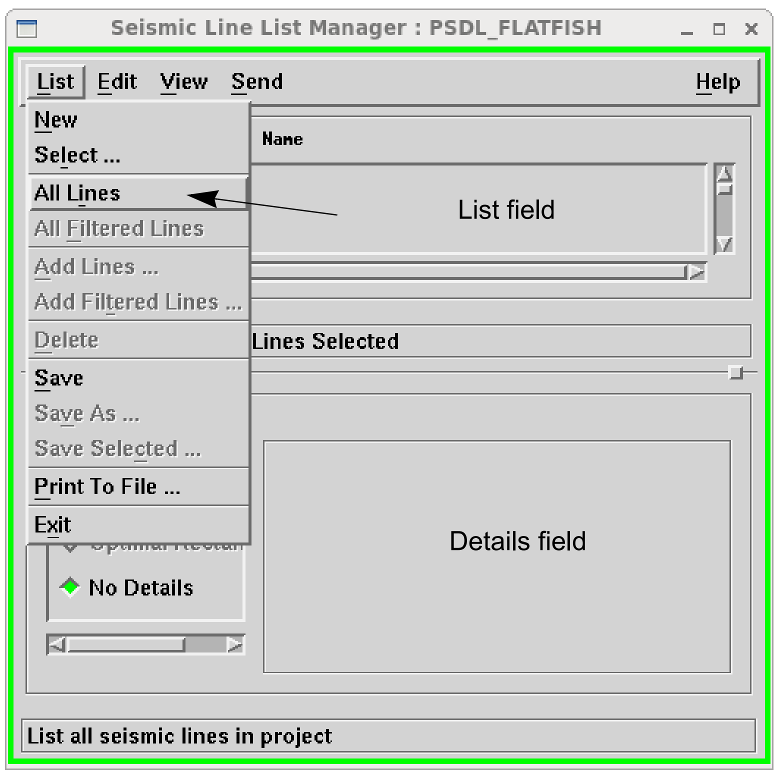
Exercise 2: Creating a 2D Seismic Line List with Seismic Line List Manager

In the following exercise, you create the same 2D line list using Seismic Line List Manager in the **PSDL_FLATFISH** project database.

1. From the OpenWorks command menu, select **Data > Management > List Management> Seismic List Manager** *or* open from **Seismic Tools > Utilities > Seismic Line List Manager**.

2. Select **List > All Lines**

All available 2D lines in the project will be displayed in the Seismic Line List Manager. Your lines may be different depending on the workshops you have completed in previous exercises, though the eight G89A lines should be present.



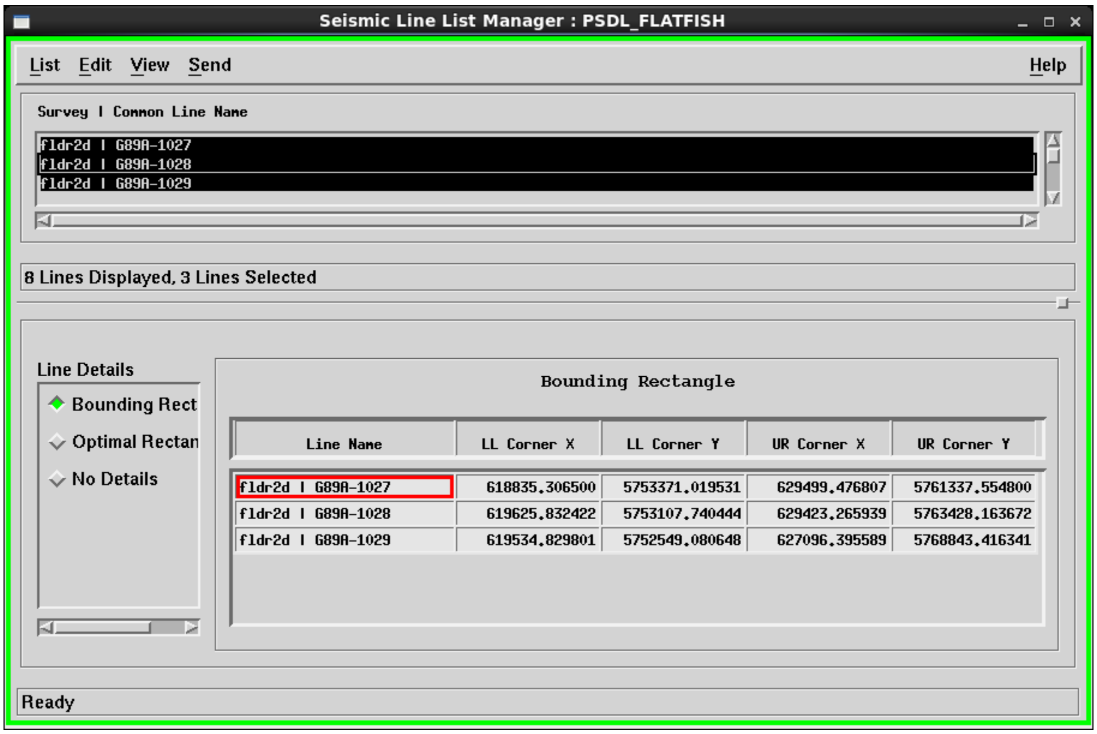
The **Menu bar** contains the List, Edit, View, Send, and Help pulldown menus.

The **List** field displays the retrieved seismic lines or seismic lines received via the Pointing Dispatcher.

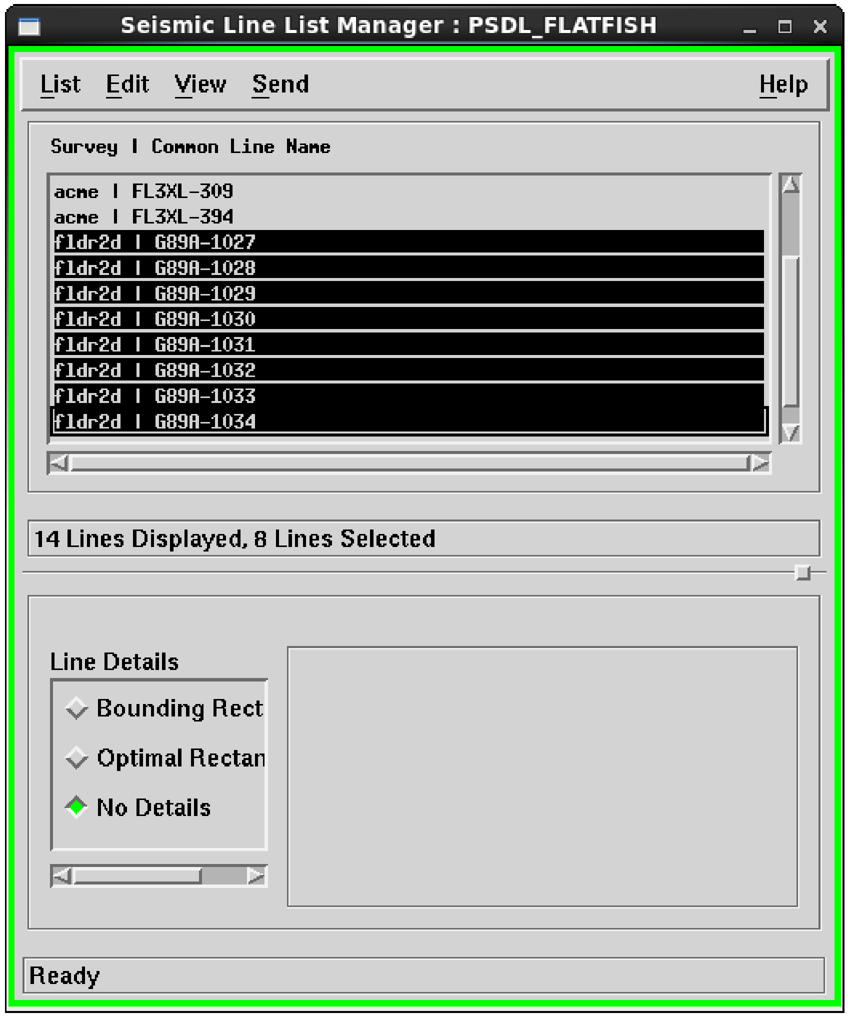
Use the **Line Details** options to display location information for a seismic line.

The **Line Details** field displays the details for each seismic line.

You can resize the entire window or use the *sash handle* to resize the list and detail fields.



3. Highlight the G89A lines (press and hold **MB1** while selecting the lines).



Some other options for line selection are described below (exercise continues with Step 4).

Filter Lines Selection Options

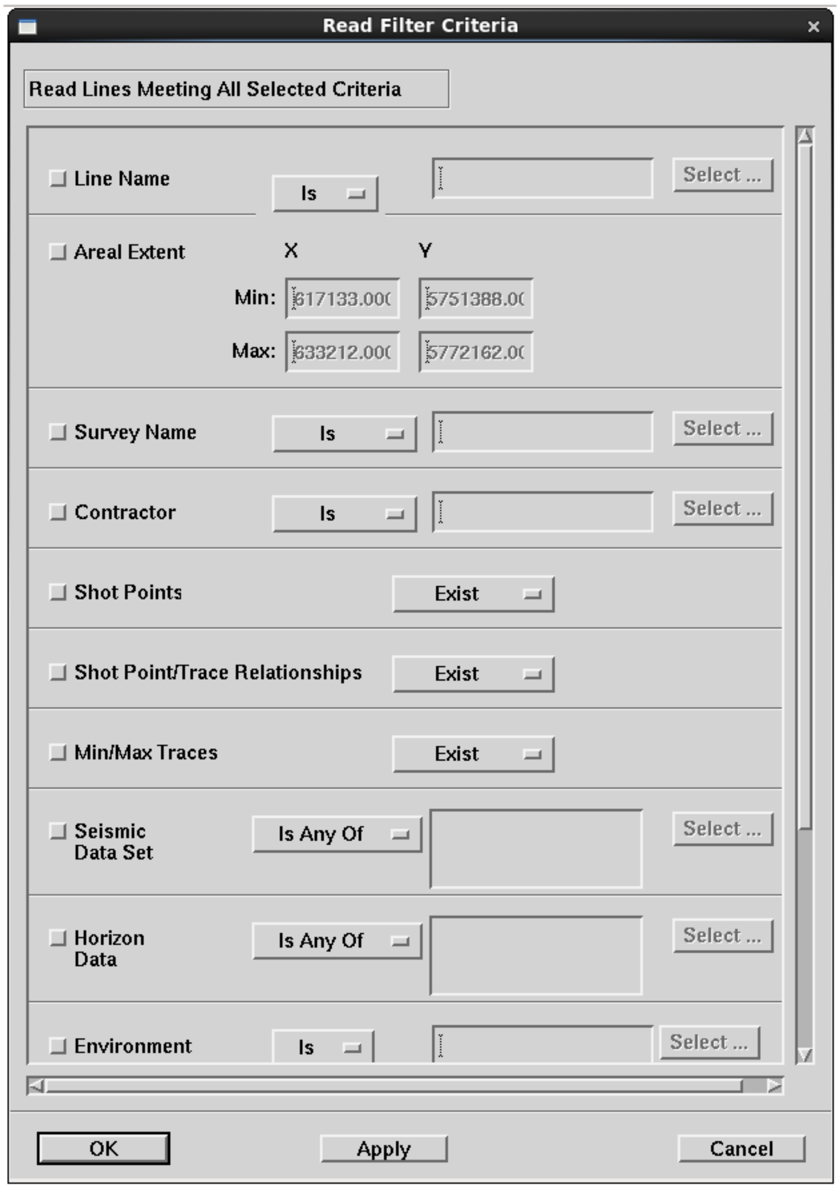
If you have many lines you could use the filtering options (**View** > **Read Filter Criteria…** or **View > Selection Filter Criteria…**) to select lines by survey name or other criteria.

When defining filter criteria, choose from the following two filtering options:

- **Read Filter Criteria** – use to select lines from the current OpenWorks project
- **Selection Filter Criteria** – use to select lines from a displayed list of lines.

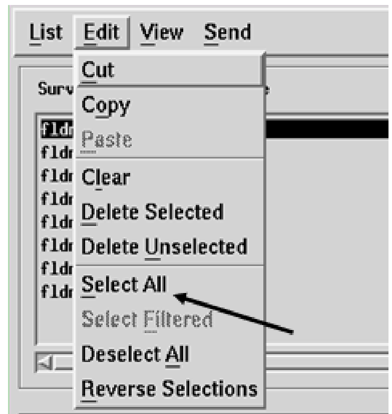
The filter choices are the same for both options, but they are applied differently. If you have selected a list of lines and want set another criteria for those lines, use *Selection Filter Criteria*.

The *Read Filter Criteria* dialog box is shown below.

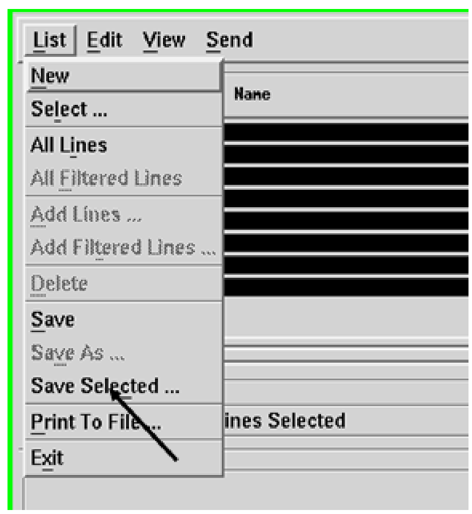


All Lines Selection

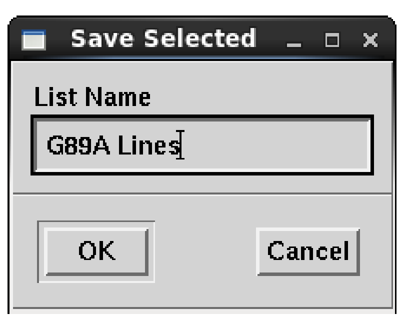
If you wanted to make a list of all the lines displayed, click **Edit > Select All**.



4. Click **List > Save Selected** to save the selected line to a line list.

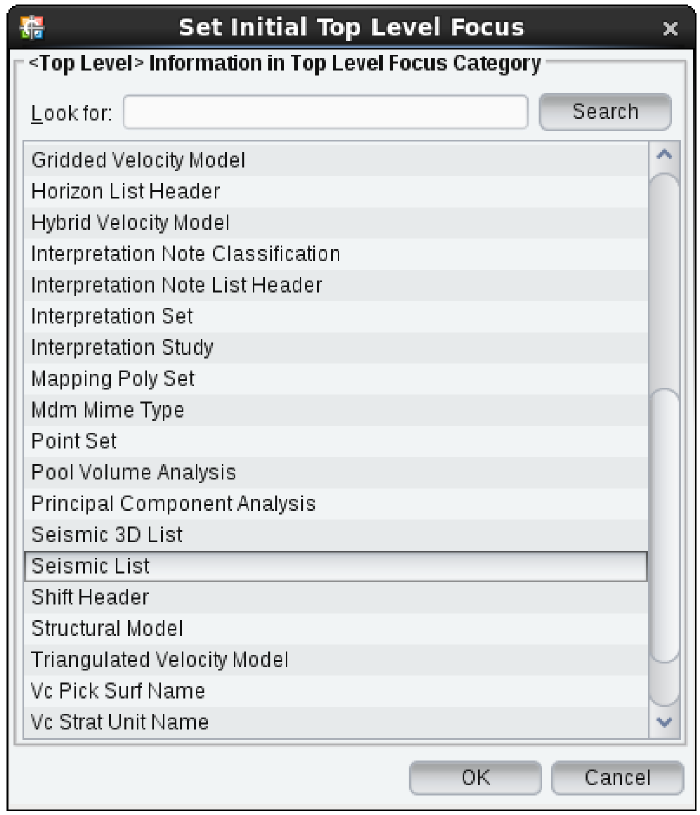


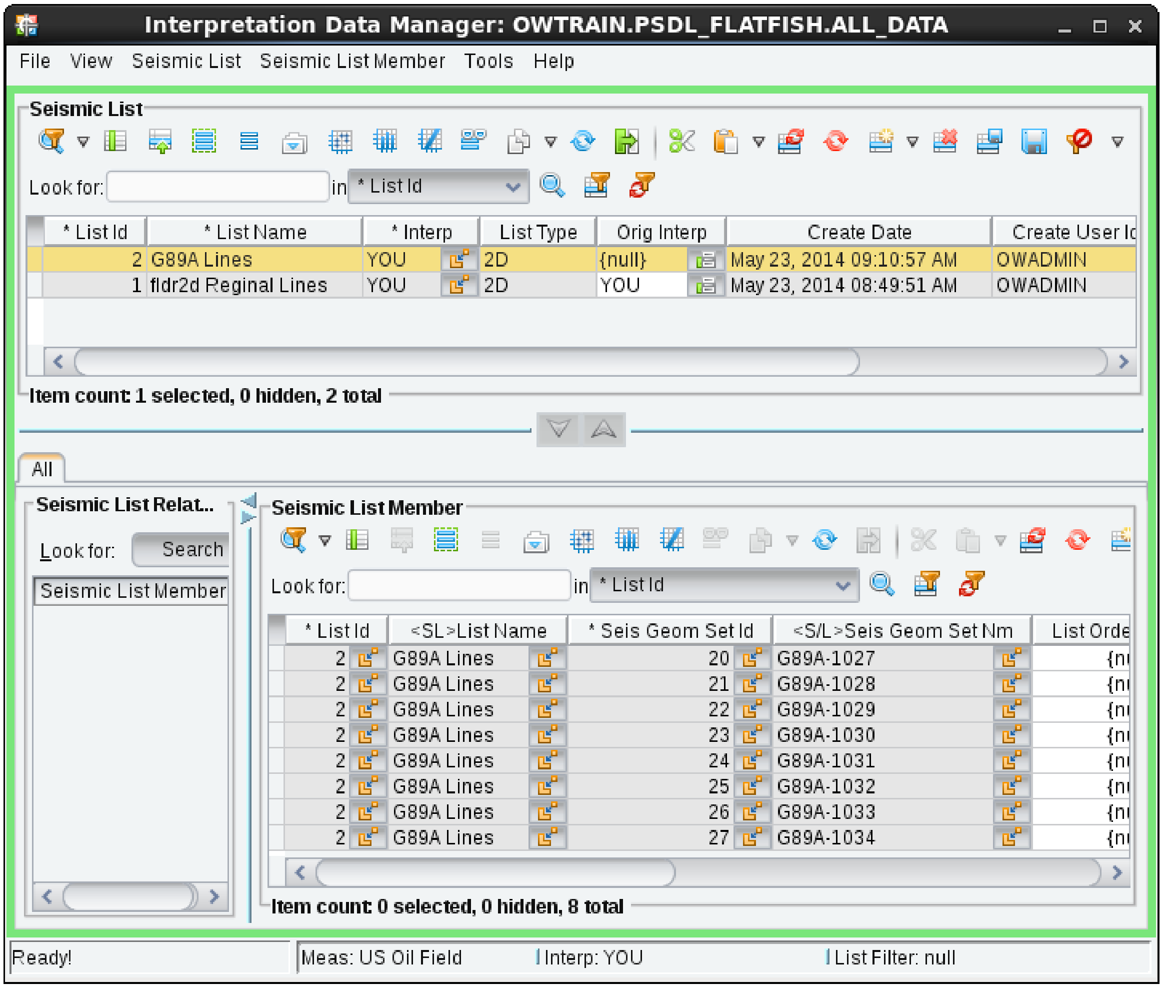
5. Enter a name (**G89A lines**) for the line list that you want to save, then click **OK**.



The seismic line list is now available for use is any application that accepts seismic line lists.

Line lists can be viewed and managed in Interpretation Data Manager (**Data > Management > Interpretation Data Manager**) by selecting *Seismic List* for the top level focus.





Many types of data may be managed in Interpretation Data Manager which will be outlined in more detail later in this chapter.

Creating and Modifying Interpretation Projects

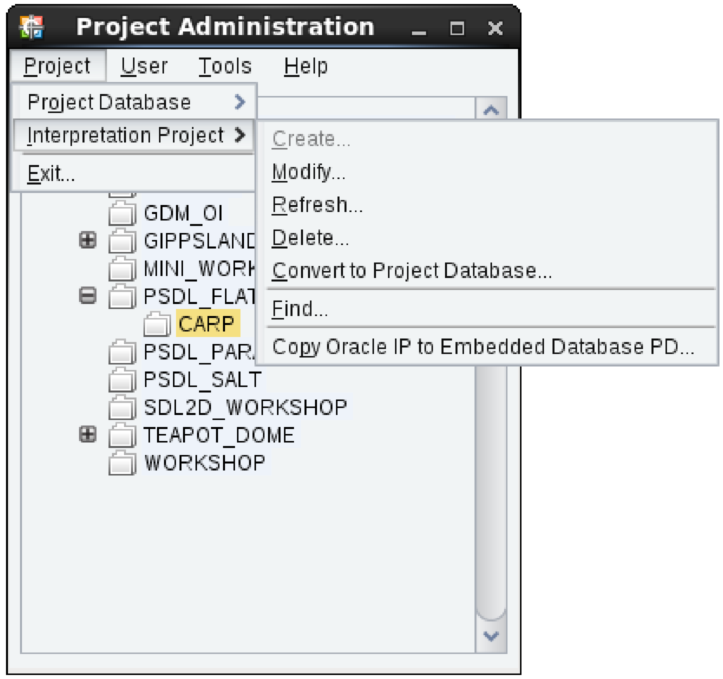
Data in Interpretation Projects

An interpretation project is a view of selected data from a project database. When an interpretation project is created, the project is a snapshot of the selected data in the project database at the time of the interpretation project's creation. If data (such as new wells or seismic data) are added to the project database, the data is only available to the interpretation project when it is *refreshed*. This updating process can be started manually or be configured to periodically update.

An interpretation project accesses the geological and geophysical data (such as well and seismic data, production information, and logs) as well as reference data loaded into its project database. As data is interpreted in an *interpretation project* it becomes a part of the *project database*.

Project Admin is used to create and manage interpretation projects using the following options:

- **Create** – create interpretation project from selected data
- **Modify** – change the cartographic reference system, project description, amount and location of the physical storage for the project, project extent, default map projection
- **Refresh** – manually update an interpretation project to include data changes in the project database after the interpretation project creation
- **Delete** – delete an interpretation project
- **Convert to Project Database** – change the interpretation project into a project database
- **Find** – quickly search for interpretation projects by name



Certain types of information are unique to the interpretation project, such as lists of data (such as of wells or faults), or interpretation sets (references to other project data).

When an interpretation project is deleted, such data are deleted, but the geological, geophysical, and reference data loaded into and the interpretation data created in the project database remains.

A list of the database tables in an interpretation project which are deleted when an interpretation project is deleted is provided in tables in the online help menu (**OpenWorks command menu** > **Online Help** > **Project Management** > **Project Administration** > **Tables Containing Interpretation Data**).

These tables can be characterized with the following categories:

- Horizon Catalog
- Interpretation Project Definition (as configured in Project Administration)
- Interpretation Sets

- Lists (fault lists, field lists, grid lists, horizon lists, interpretation note lists, lease lists, seismic 3D lists, seismic line lists, well lists, well location lists, work set lists)
- Seismic Decimation Data
- Seismic Fault Data
- Seismic Mistie Functions
- Seismic Shifts

Backing up an Interpretation Project

From Release 5000.0.3.0, functionality has been added to allow the independent backup of an Interpretation Project (IP).

Since an IP comprises a number of database views of its parent Project Database, all the data is actually stored in the Project Database. The functionality works as below:

- Convert the Interpretation Project to a new Project Database but only migrating the data visible to the IP
- This new Project Database can then be backed up and restored via the relevant options in *Project Administration*.

Note that when restoring a project backed up in this manner, it is not possible to restore it as an IP project within an existing Project Database.

The actual steps to perform the backup via the *Project Administration* tool are:

- Highlight the required Interpretation Project from the list of projects and then from either the popup menu accessed through MB3, or select **Project > Interpretation Project > Convert to Project Database...** . This action will start a wizard which will request certain information.
- Then complete these steps:
  - — Step 1 of 4: Provide a name for the new Project Database and, if required enter a description
  - — Step 2 of 4: If required, edit the Project Size parameters

— Step 3 of 4: This step provides a summary of the Area of Interest of the project that will be created

— Step 4 of 4: Allows a backup of the new project to be generated, with or without external data file, immediately after the project is created

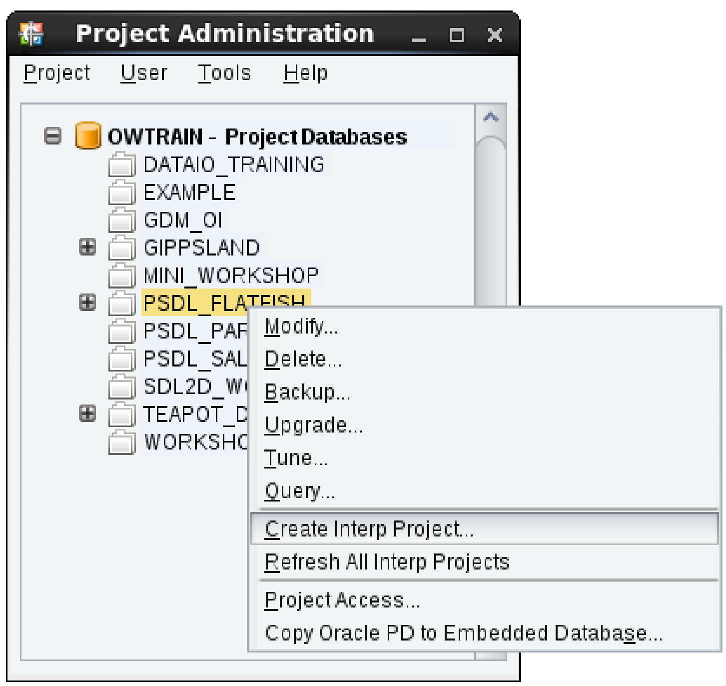
Exercise 3: Create an Interpretation Project

In this exercise, you will create a new IP project using the line list that you created in the previous exercise.

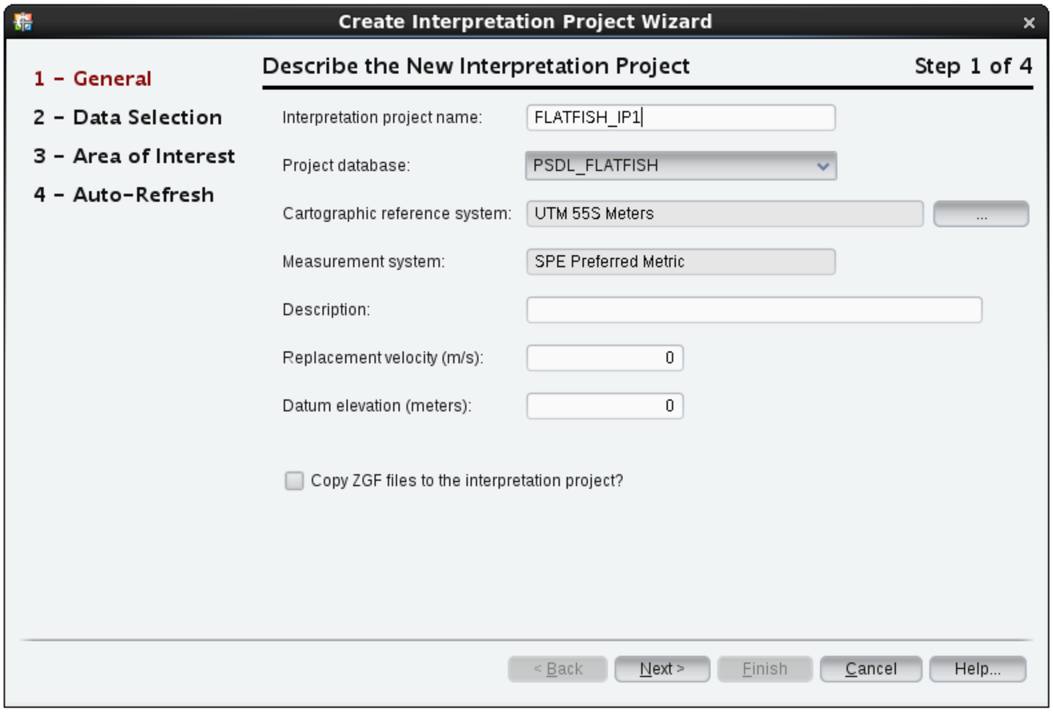
1. From the OpenWorks command menu, select **Project > Project Admin**

2. Select **PSDL_FLATFISH** Project Database and click **MB3**

3. Select **Create Interp Project…**



4. In the Create Interpretation Project Wizard window, type in **FLATFISH_IP1** as your Interpretation project name.

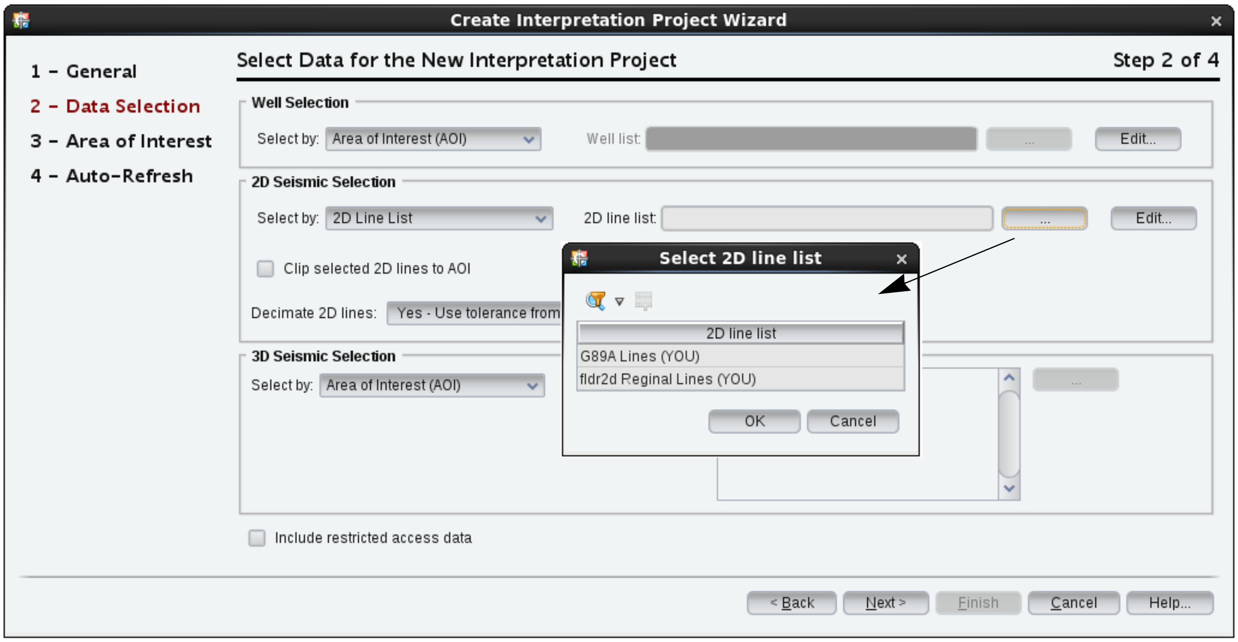


Optional:

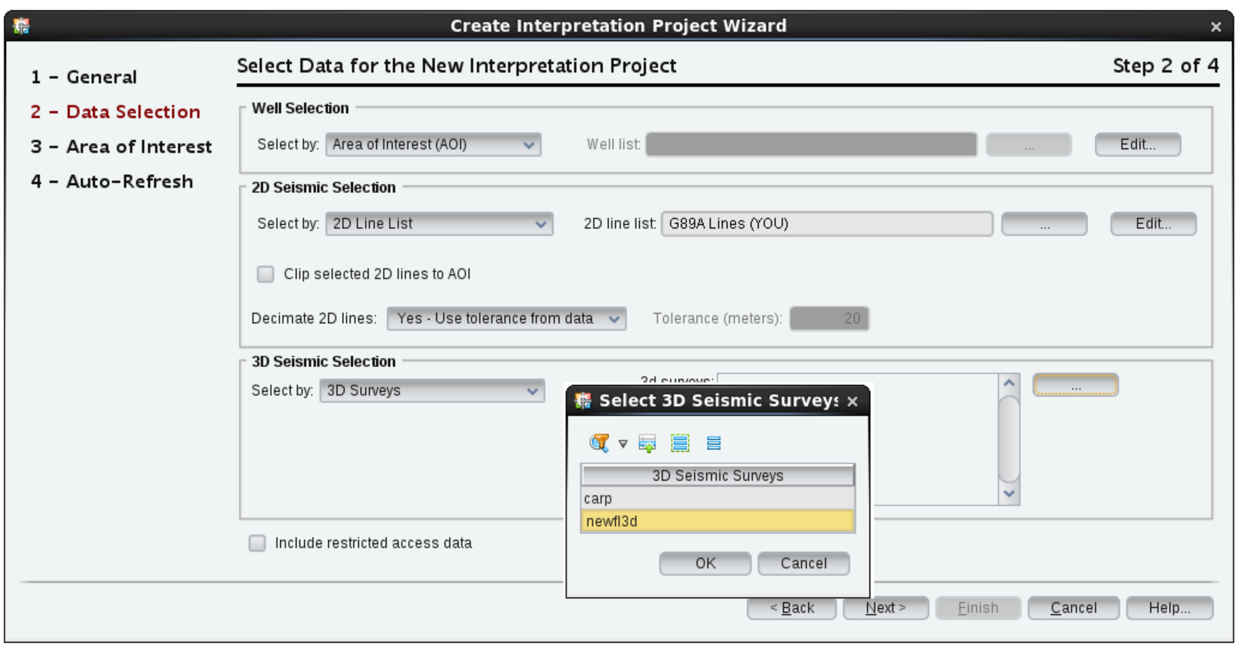
- Add a description (up to eighty characters of text)
- Change the cartographic reference system and/or measurement system, if desired
- Input the replacement velocity and datum if known
- Copy ZGF files from the project database (OW_RPOJ_DATA/<projectname>/ZGF) to the interpretation project

5. Click **Next**.

6. In the 2D Seismic Selection, change Select by to **2D Line List**, then click (...) to select *G89A lines* as your 2D Line List. Click **OK**.



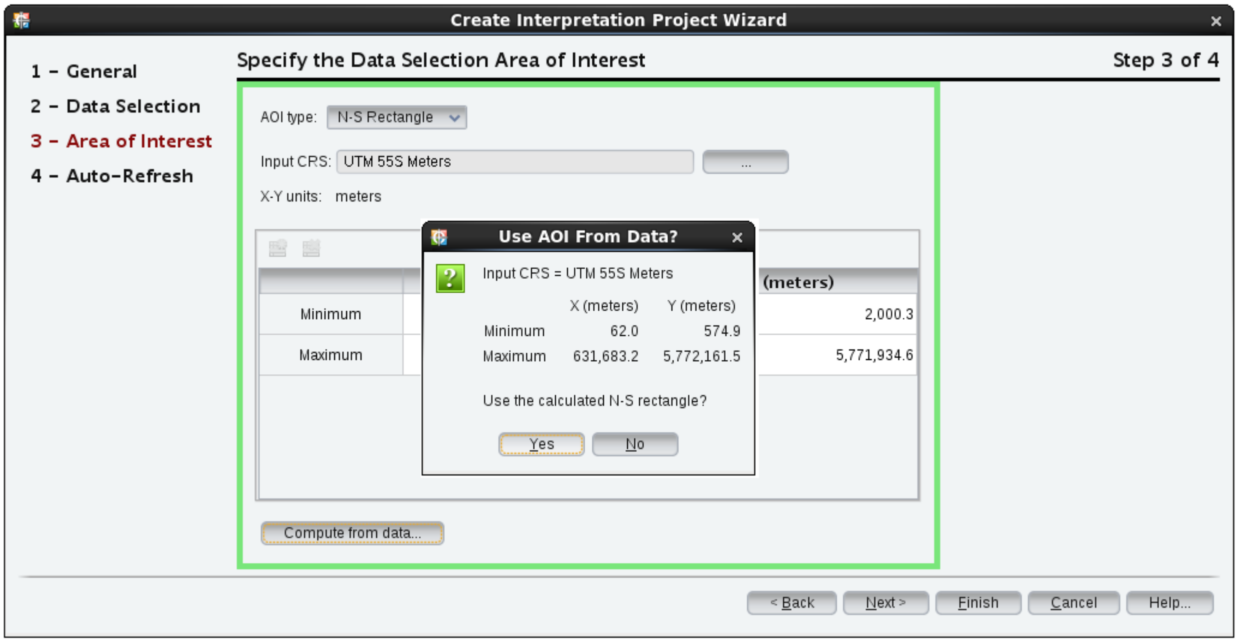
7. In the 3D Seismic Selection, change the Select by to 3D Surveys.



8. Click (...) to get a list of surveys, and add the *newfl3d* to the interpretation project.

9. Click **OK**.

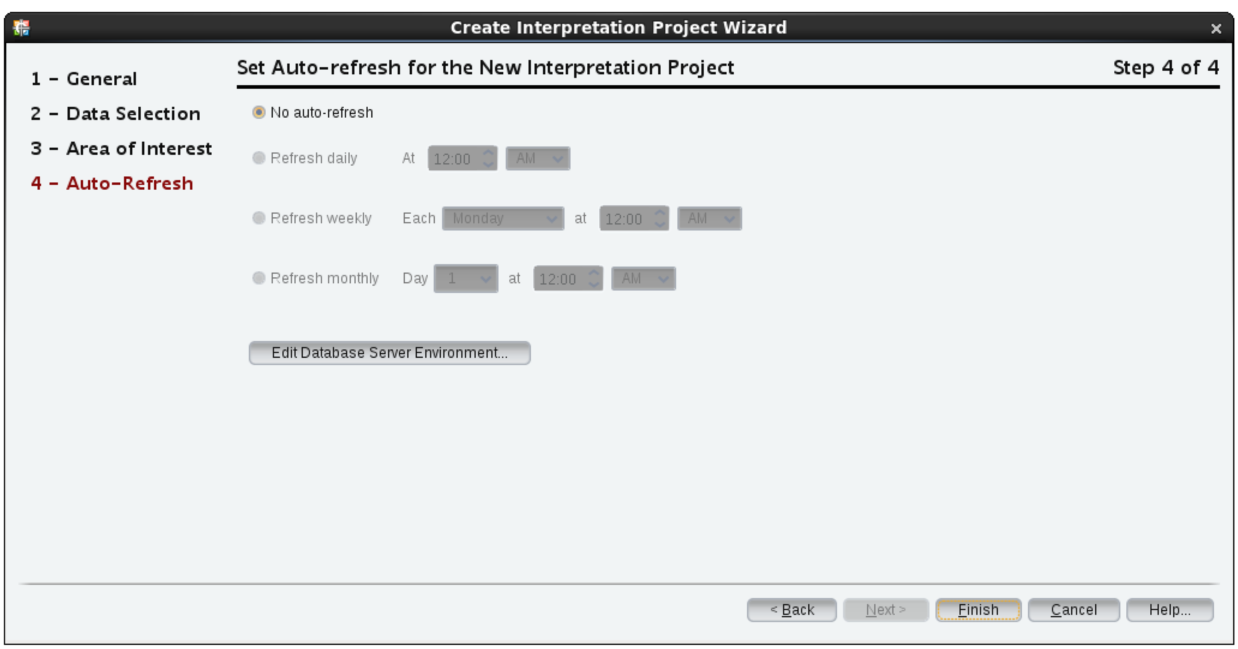
10. Click **Next**.



If you want to compute the AOI from the data, click on Compute from data option. A reminder window appears requesting for your confirmation to use AOI from data, click **Yes** to proceed or **No** if you do not want to Compute from data.

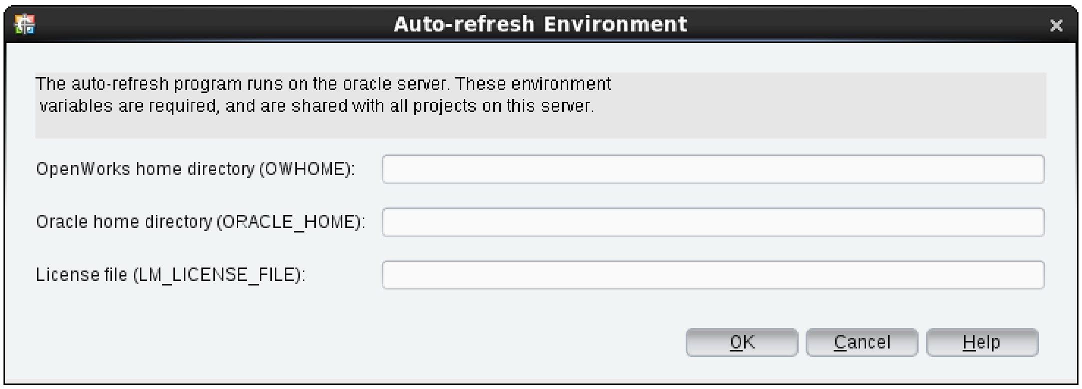
11. Click **Next** to continue to the Auto-refresh panel.

12. Leave the **No auto-refresh** option as the default. Click **Finish**.



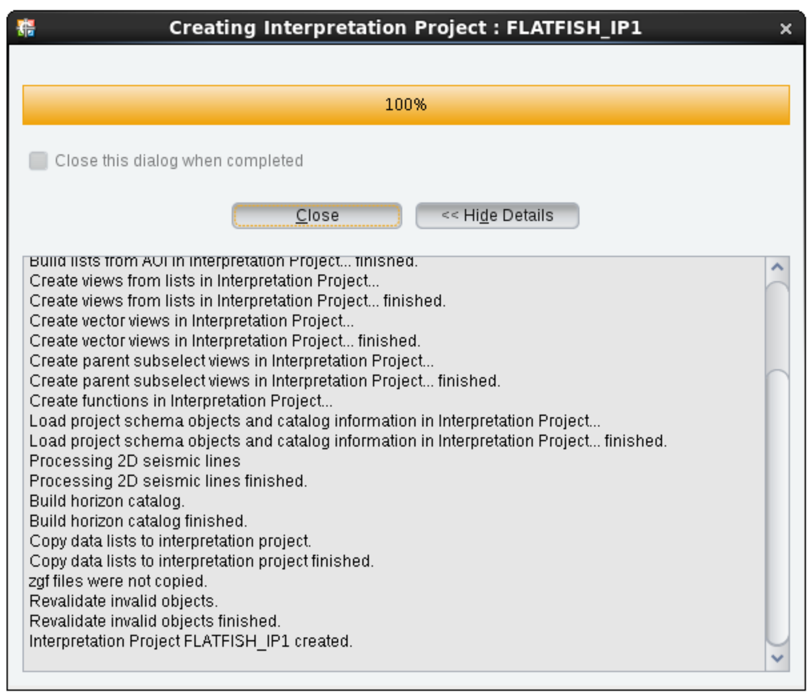
With the No auto-refresh option selected, the interpretation project must be refreshed manually from Project Admin or a script (owinterpPrjRefresh).

If you want to set a refresh schedule, click **Edit Database Server Environment…**, fill out the required information and then set your choice for the refresh option.

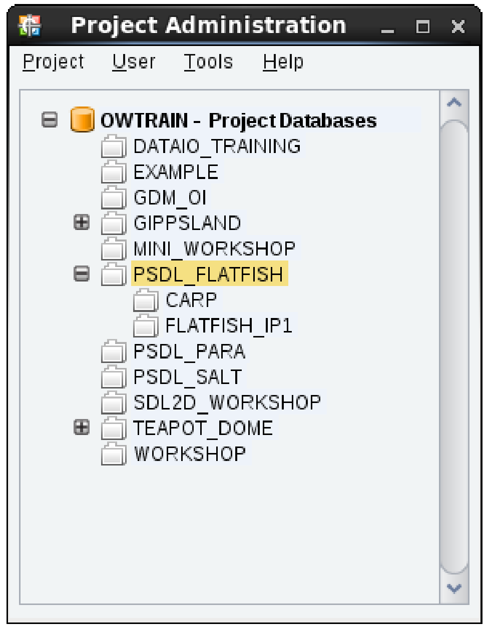


When you click Finish, the Creating Interpretation Project window appears showing the progress for the project creation.

13. Click **Close** once the Interpretation Project creation is completed.

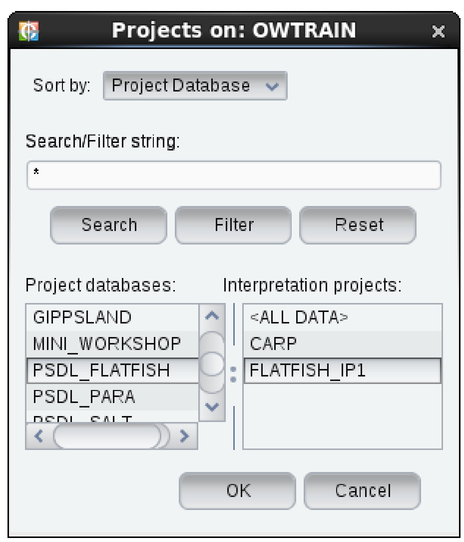


The interpretation project is listed in Project Admin under the PSDL_FLATFISH project database.



Use the Project Status Tool to select the OpenWorks project database or the interpretation project, depending on your workflow needs.

- To select the project database highlight the **<ALL DATA>** option.
- To select the interpretation project, highlight **FLATFISH_IP1**.



Modifying Interpretation Projects

After you create an interpretation project or restore a project database, you can modify the parameters of an interpretation project.

When to Re-triangulate Faults

Newly created interpretation projects, or changes to datum, velocity, or the area of interest (AOI) of interpretation projects or of project databases will invalidate all fault planes and make re-triangulation of the fault planes necessary.

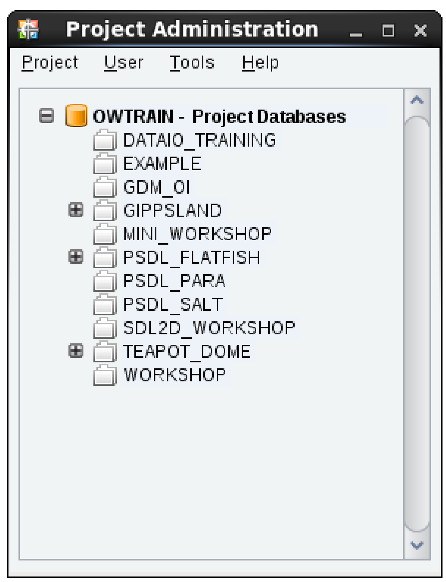
Workflow to modify an interpretation project:

1. Log on as an OpenWorks user with the OW_Administrator role in the OpenWorks instance.

Start Project Administration.

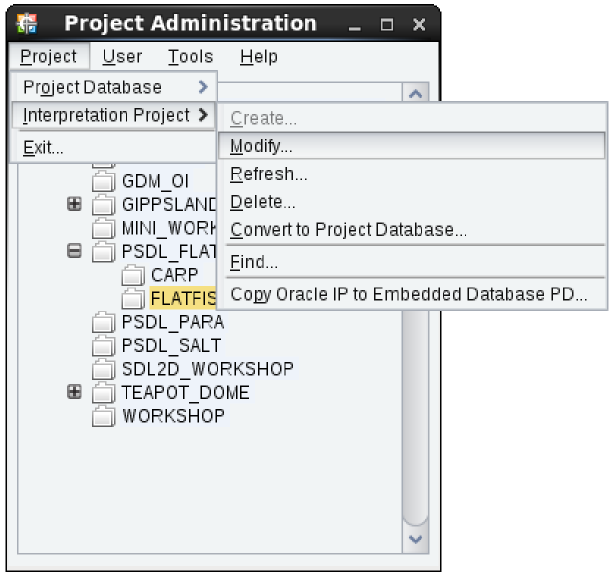
2. From the OpenWorks command menu, select **Project > Project Administration**.

   The Project Administration window displays.



3. Select an interpretation project in the window's list box.

4. Select **Project** > **Interpretation Project** > **Modify**.



The *Modify Interpretation Project* dialog box displays. The General tab is open.

5. Change parameters of the project on the tabs in the dialog.

For more information about the parameters that you can change in the *Modify Interpretation Project* dialog box, see the sections below:

- General tab
- Data Selection tab
- Area Of Interest tab
- Auto Refresh tab
- Options tab

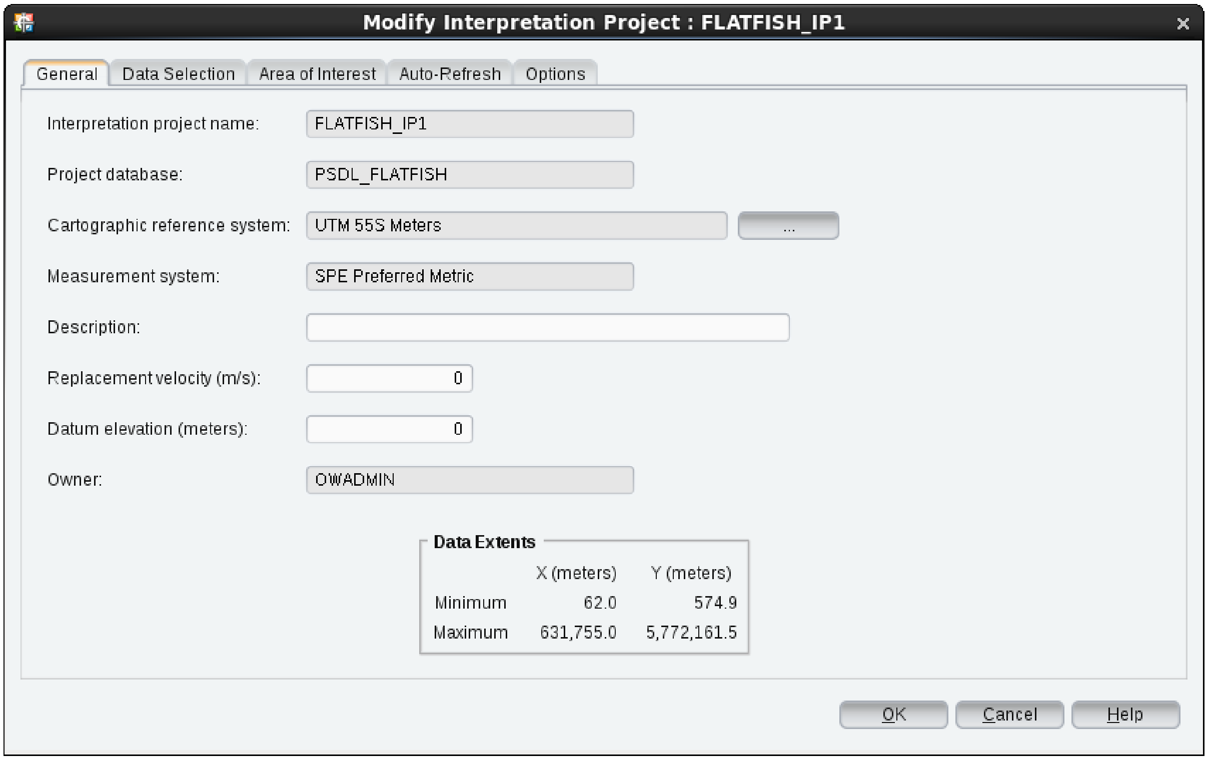
6. Click **OK** to modify the project.

The Modifying Interpretation Project dialog displays messages about the progress of the modifications to the project database.

7. After the modification is complete, click **Close**.

More details about the Tabs:

General Tab



The General tab allows you to change the following parameters:

- **Cartographic Reference System**: If you select a cartographic reference system (CRS) different from the CRS in the project database, a valid conversion must exist between the old CRS and the new. To change the CRS, click the Browse (**...**) button. The *Select Coordinate System* dialog box displays. Select a projected or geographic coordinate system for storing and converting project map coordinates, and then click **OK**.

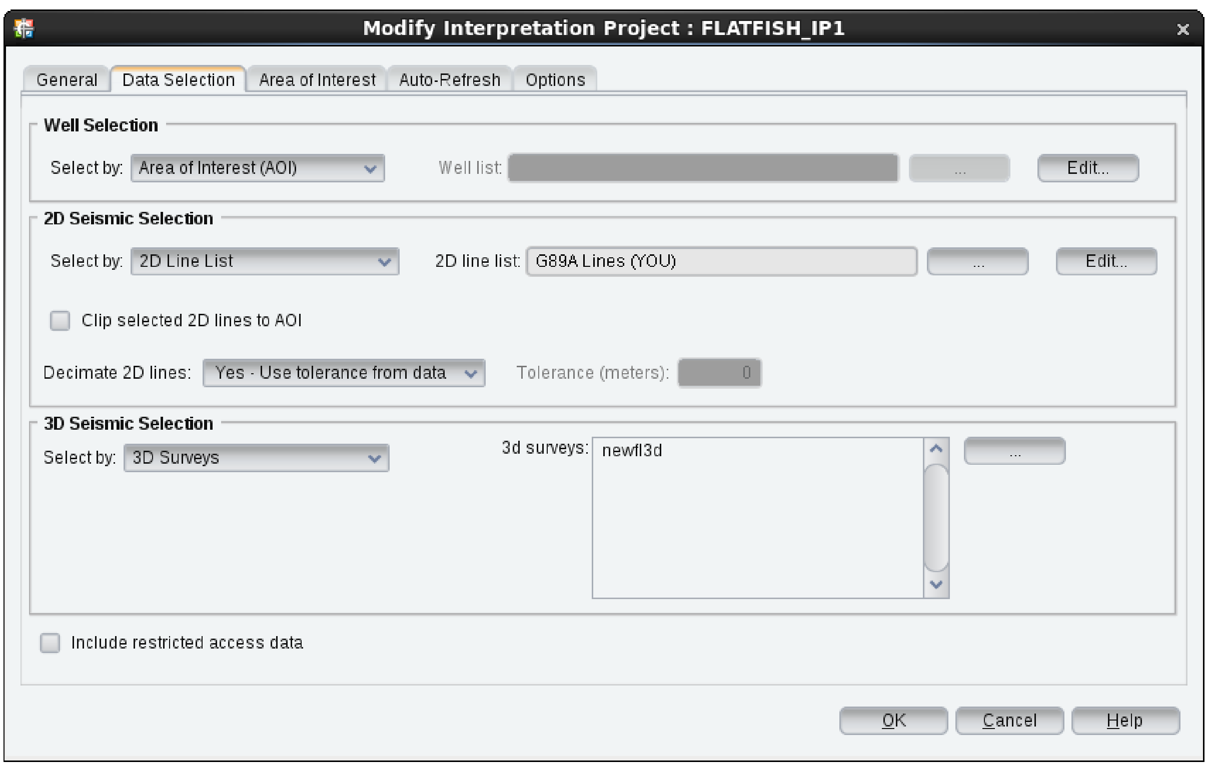
  If the available coordinate systems in the OpenWorks instance are not correct for the data that will be loaded into the project, a new coordinate system can be created for the project in the *Map Projection Editor* dialog box. Click the **Create** button in the *Select Coordinate System* dialog box to display the *Map Projection Editor*.

- **Description**: Enter up to eighty characters of descriptive text, as needed.

- **Replacement Velocity**: If needed to preserve the time-structure relationship in the data, enter a replacement velocity for the data. The units depend on the measurement system configured in the project database. The value is applied to all well locations in the interpretation project.

- **Datum Elevation**: If needed to preserve the time-structure relationship in the data, enter a new datum elevation. The units depend on the measurement system configured in the project database. All z-coordinates refer to this value. The datum elevation represents a datum to which depth measurements are corrected. If your project involves multiple surfaces above sea level, select a datum at least equal to the shallowest Kelly bushing (or KB).

Data Selection Tab

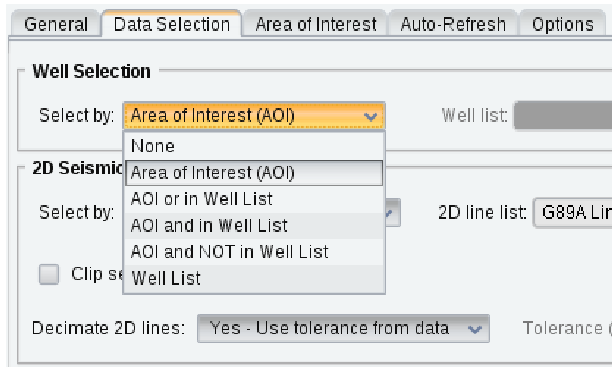


In this tab, you can select which data to include in the interpretation project. Depending on the type of data, the criteria for selection can be the area of interest selected for the interpretation project or the selection can be based upon whether a type of data is in or out of a list or survey (2D seismic or well lists, or 3D surveys).

- Well Selection

To change the selection criterion for selecting well data from the project database to include in the interpretation project:

1. Select one of the items in the **Select By** drop-down list box in the Well Selection group box to determine which well data are added to the project.



— **None**: No wells from the project database are added to the interpretation project. Select this item if no well data are in the project database, or you do not want well data in your interpretation project.

— **Area of Interest (AOI)**: Only well data in the project database that are within the AOI (as defined in the *Area of Interest* tab in this dialog) are added to the interpretation project.

— **AOI and in Well List**: Only well data that are within the AOI and that are enumerated in a well list are added to the interpretation project.

— **AOI and NOT in Well List**: Only well data that are within the AOI and that are not enumerated in a well list are added to the interpretation project.

— **Well List**: Only well data enumerated in a well list are added to the interpretation project.

2. If you selected AOI and in Well List, AOI and NOT in Well List, or Well List, and if you want to look at the available well lists in detail, or if you want to create a new well list, click **Edit** in the Well Selection group box. The Well List Manager window displays.

3. If you selected AOI and in Well List, AOI and NOT in Well List, or Well List, click the **Browse** (**…**) button. The *Select Well List* dialog box displays.

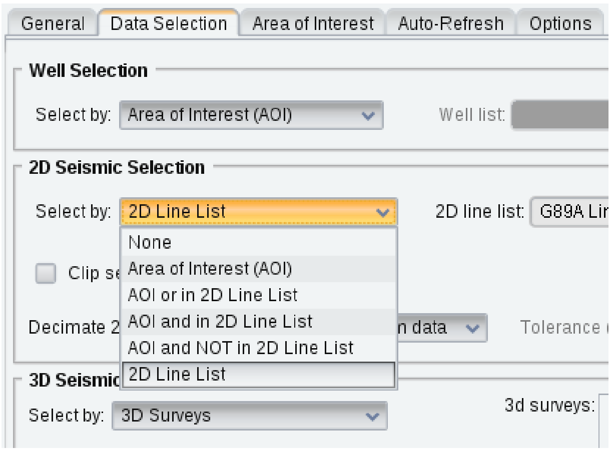
4. Select the name of a well list that the creation process will use as a selection criterion for well data.

5. Click **OK** in the *Select Well List* dialog box. The name displays in the **Well List** text box.

- 2D Seismic Selection

To change the selection criterion for selecting 2D seismic data from the project database to include in the interpretation project, do the following:

1. Select one of the items in the **Select By** drop-down list box in the 2D Seismic Selection group box to determine which 2D seismic data are added to the project.



— **None**: No 2D seismic data from the project database are added to the interpretation project. Select this item if no 2D seismic data are in the project database, or if you do not want to include 2D data in your interpretation project.

— **Area of Interest (AOI)**: Only 2D seismic data in the project database that are within the AOI (as defined in the *Area of Interest* tab in this dialog).

— **AOI or in 2D Line List**: 2D seismic data that are within the AOI or that are enumerated in the selected 2D line list are added to the interpretation project.

— **AOI and in 2D Line List**: Only 2D seismic data that are within the AOI and that are enumerated in the selected 2D line list are added to the interpretation project.

— **AOI and NOT in 2D Line List**: Only 2D seismic data that are within the AOI and that are not enumerated in the selected 2D line list are added to the interpretation project.

— **2D Line List**: Only 2D seismic data enumerated in a 2D line list are added to the interpretation project.

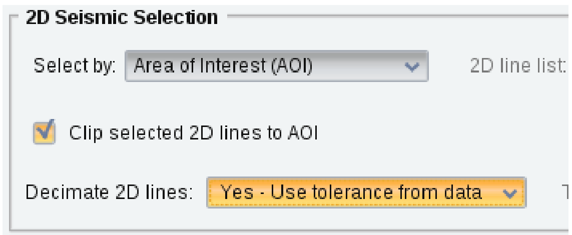
2. If you selected any choice with a 2D Line List option and want to create a new 2D line list, click **Edit** in the 2D Seismic Selection group box. The Seismic Line List Manager window displays.

3. If you selected any choice with a 2D Line List option, click the **Browse** (**…**) button to select the desired list.

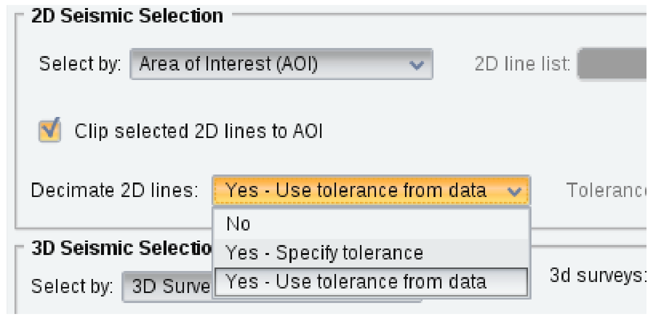
   — Select the name of a 2D line list that the creation process will use as a selection criterion for 2D seismic data.

   — Click **OK** in the *Select 2D Line List* dialog box. The name displays in the 2D Line List text box.

4. To include only the portion of the 2D lines that is in the AOI, check **Clip selected 2D lines to AOI**. If unchecked, the entire 2D line of every 2D line in the AOI will be included in the interpretation project.



5. In **Decimate 2D lines**, select a method of decimating the over-sampling of the 2D lines. The OpenWorks software stores both the original data and the decimated data.



— **No**: Decimation will not occur when the 2D seismic data is added to the interpretation project.

— **Yes - Specify tolerance**: The 2D seismic data will be decimated by a tolerance value you enter as the data is added to the interpretation project.

— **Yes - Use tolerance from data**: The 2D seismic data will be decimated according to the value in the data.

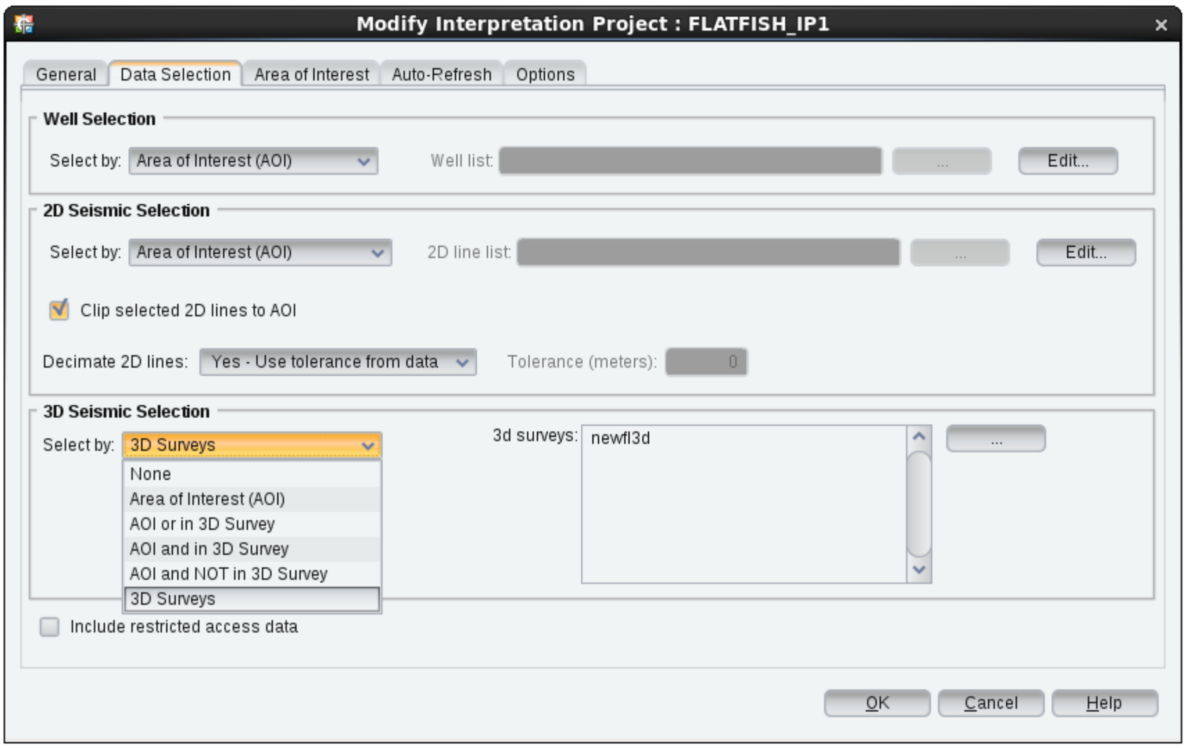
6. If you selected **Yes - Specify tolerance**, enter a value in the Tolerance text box that is appropriate to the 2D seismic data in the project area. The value must be a non-negative number.

The amount of the value controls the amount of decimation: the greater the value, the greater the decimation. A value of zero is no decimation.

- 3D Seismic Selection

To change the selection criterion for selecting 3D seismic data from the project database that should be included in the interpretation project, do the following:

1. Select one of the items in the **Select By** drop-down list box in the 3D Seismic Selection group box to determine which 3D seismic data are added to the project.



— **None**: No 3D seismic data from the project database are added to the interpretation project. Select this item if no 3D seismic data are in the project database, or if you do not want any 3D data in the interpretation project.

— **Area of Interest (AOI)**: Only 3D seismic data in the project database that are within the AOI (as defined in the *Area of Interest* tab in this dialog) are added to the interpretation project.

— **AOI or in 3D Survey**: Only 3D seismic data that are within the AOI or in a selected 3D survey are added to the interpretation project.

— **AOI and in 3D Survey**: Only 3D seismic data that are within the AOI and that are in a selected 3D survey are added to the interpretation project.

— **AOI and NOT in 3D Survey**: Only 3D seismic data that are within the AOI and that are not in a selected 3D survey are added to the interpretation project.

— **3D Surveys**: Only 3D seismic data in selected 3D surveys are added to the interpretation project.

2. If you selected any option using a 3D survey, click the **Browse** (**…**) button. The *Select 3D Seismic Surveys* dialog box displays.

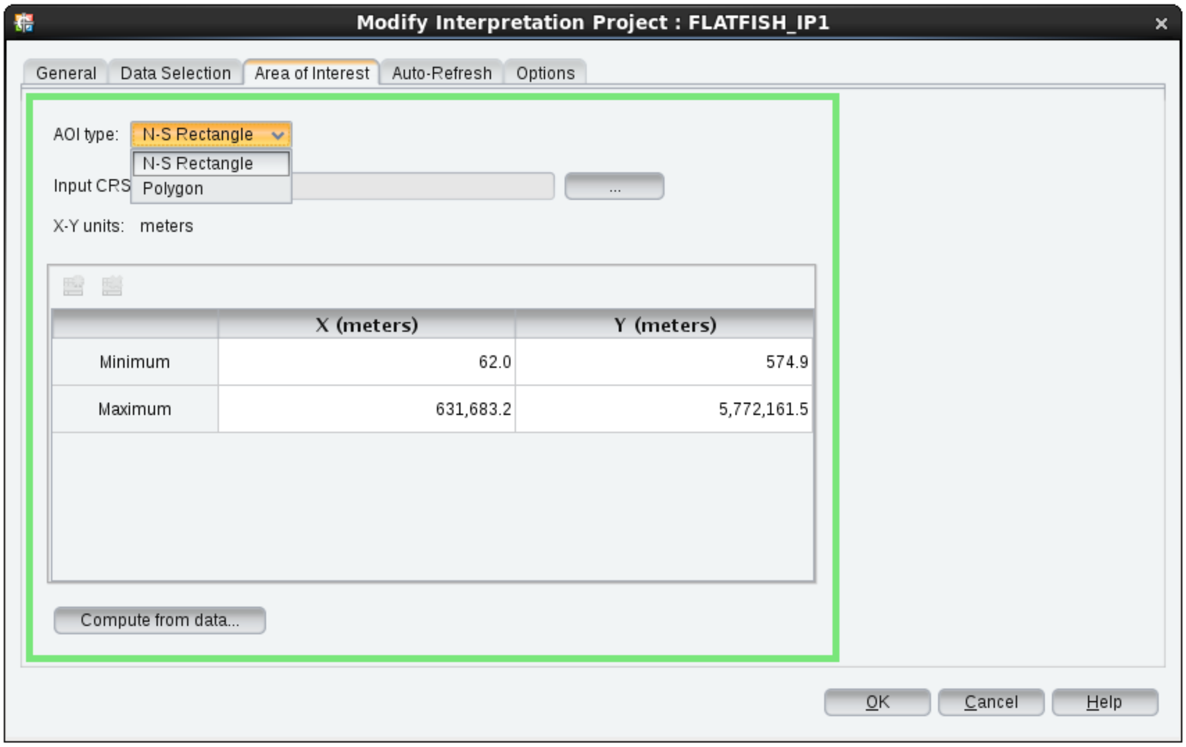
   — Select the name of one or more 3D surveys that the creation process will use as a selection criterion for 3D seismic data.

   — Click **OK** in the *Select 3D Survey List* dialog box. The name of each selected survey displays in the 3D Surveys list box.

- Other Parameters

If the well or seismic data contain a well, 2D line, or 3D survey which has been designated as restricted, or tight, and if you want that data in the interpretation project, check Include Restricted Access Data. If unchecked, restricted data will not be added to the interpretation project.

Area of Interest Tab



To change the area of interest for the project, do the following:

1. In **AOI Type**, select how the AOI is determined.

   N-S Rectangle: Creates a rectangular area, where each side of the rectangle is defined as a line perpendicular to an x or y axis of the Input CRS and as a distance (in a unit of measure defined in the measurement system) from the origin of the axis.

   Polygon: Defines a polygonal area (of three or more points), where each endpoint (x,y pair) of the polygon is a distance (in a unit of measure defined in the measurement system) from the origin of the x,y axis of the Input CRS.

2. If the coordinate system of the data in the area of interest should be different for this AOI, click the Browse button (**…**) next to the **Input CRS** box. A valid conversion must exist between the old CRS and the new CRS.

   The *Select Coordinate System* dialog box displays. Select a projected or geographic coordinate system for the map projection. A coordinate system may be selected that is more convenient or visually pleasing for the map data in the area of interest. Click **OK**.

If the available coordinate systems are not correct for the projection, create a new coordinate reference system in *Map Projection Editor* by clicking the **Create** button in the *Select Coordinate System* dialog box to access *Map Projection Editor*.

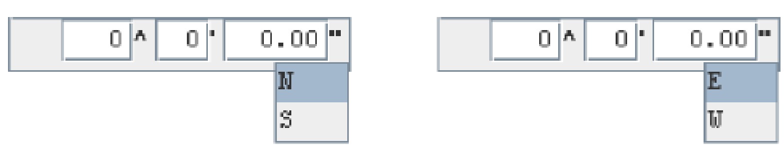
3. If the coordinate system is a geographic coordinate system, select Decimal or D-M-S in the **Lat-Lon Format** drop-down list.

— If you select Decimal in the *Lat-Lon Format* drop-down box, enter a number of degrees in each Latitude and Longitude text boxes, both minimum and maximum degrees for each.

Use the value to the left of the decimal point as degrees and the value to the right of the decimal point as fractions of a degree. Valid latitudes range from -90 degrees to 90 degrees, and valid longitudes range from -180 degrees to 180 degrees. For example, enter 30 degrees South as -30 in the latitude boxes. Or, enter 20 degrees, 30 minutes North as 20.5.

— If you select D-M-S in the *Lat-Lon Format* drop-down box, enter values in each Latitude and Longitude text boxes, both minimum and maximum degrees for each.

When the insertion cursor is put in one of the text boxes, three sub-boxes and a drop-down list appears in the text box. Boxes similar to the following display:



Latitude Longitude

Enter the degrees (^), minutes ('), and seconds (") in the appropriate boxes that describe the extent of the area of interest. The latitude degrees boxes can contain values from -90 to 90, and the longitude degrees boxes can contain values from -180 to 180. The minute's box can contain 0 to 59, and the second's box can contain values from 0 to 59.99.

Negative degrees indicate locations to the South of the equator or to the West of the prime meridian. If negative degrees are entered in a box, selecting S in a Latitude box or selecting W in a Longitude box will make the number of degrees positive, changing it to N or E, respectively.

4. Enter the sides of the rectangle or the points of the polygon. You can enter them manually, or you can use an application, like the PowerView Basemap to send the coordinates of the AOI to Project Administration via the Pointing Dispatcher service. Do one of the following:

    — **Compute from data**

    If you have selected a data in a list (well or 2D seismic) or a survey list on the Data Selection tab, click the *Compute from data* button.

    The coordinates appear in the table above the button

    — **Listen For AOI**

    Check Listen For AOI.

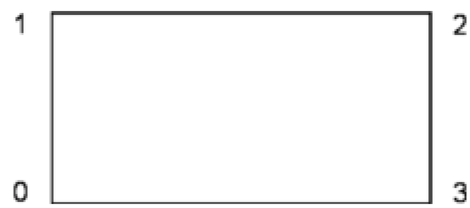
    In a mapping application (such as the PowerView software) which can use the Pointing Dispatcher, send the coordinates to Project Administration.

    — **Enter Coordinates for N-S Rectangle**

    Enter a minimum and maximum coordinate from both the x and y axes. The maximum distance must be greater than the minimum distance. The distances should not extend outside the areal extents of the project database from which this interpretation project is being subsetted.

— Enter Coordinates for Polygon

Enter the coordinates of each vertex of the polygon. The minimum number of vertices is four (or a rectangle). The polygon must be simple (the sides only intersect at the endpoints, and the sides form the boundary around an enclosed area). Enter the coordinates for the vertices in a path order and a clockwise fashion, as if you were entering the endpoints of the polygon as you follow the lines in the polygon. For example, given the rectangle below:



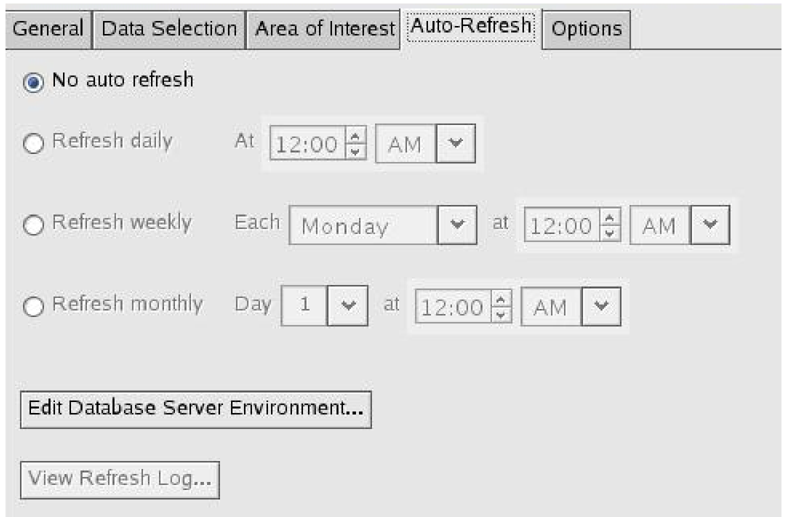
You would enter the coordinates for the endpoints in an order like the following: {0, 1, 2, 3} or {2, 3, 0, 1}, not {0, 2, 3, 1}

The coordinates should not be outside the areal extents of the project database from which this interpretation project is being subsetted.

To delete an endpoint, select a coordinate and click the **Delete Coordinate** button ().

To add another endpoint, select a coordinate where the new endpoint will be added after the coordinate, and then click the **Add Coordinate** button ().

Auto-Refresh Tab



The data in a project database may change. New data may be added, and old data may be changed or deleted. To keep the interpretation project up to date, you can manually retrieve changes from the project database (**Project > Interpretation Project > Refresh**), or you can configure the interpretation project to automatically retrieve changes from the project database.

Select one of the methods of refreshing the interpretation project.

No Auto Refresh: Changes in the project database will only be added to the interpretation project if the interpretation project is manually refreshed.

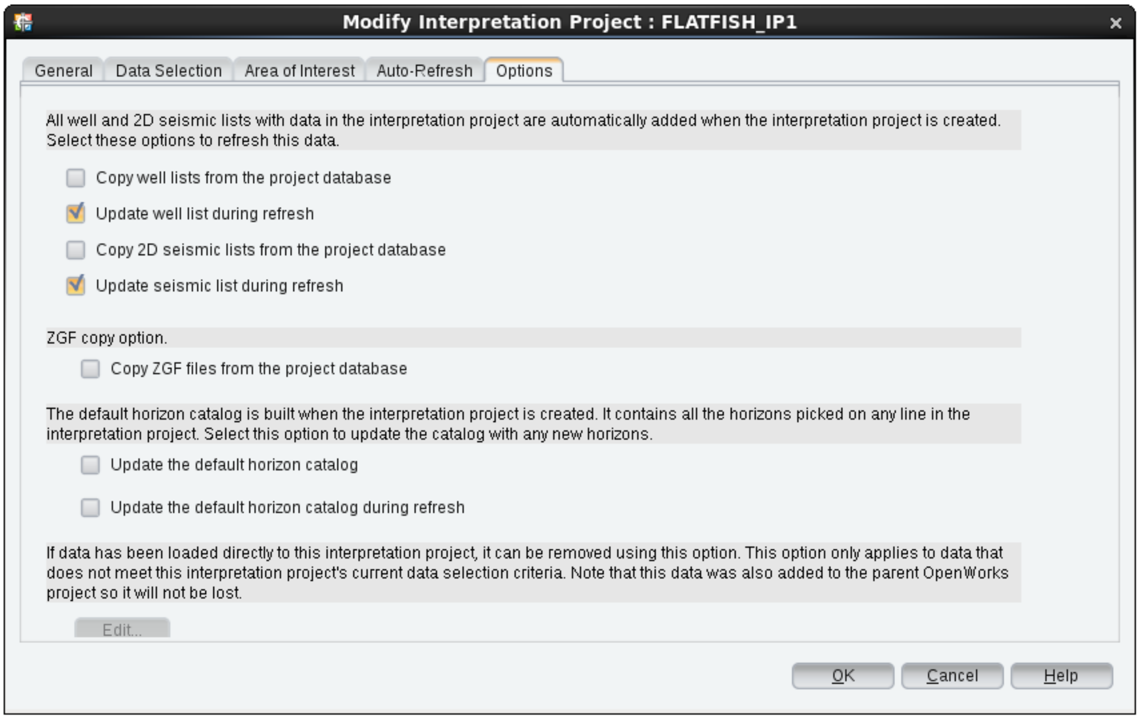
Refresh Daily: Enter a time (from 1:00 to 12:59), and select a period (AM or PM).

Refresh Weekly: Select a day of the week (Monday through Sunday), enter a time (from 1:00 to 12:59), and select a period (AM or PM).

Refresh Monthly: Select a day of the month, enter a time (from 1:00 to 12:59), and select a period (AM or PM).

To view when the interpretation project was refreshed, click **View Refresh Log…**. The *Refresh Log* dialog box displays.

Options Tab



If data (wells, or 2D or 3D seismic) were added to the interpretation project instead of the project database, click **Edit** to delete data from the project. This button becomes available when data has been added to the interpretation project, and the data lies outside of the current area of interest (AOI) defined in the interpretation project. You must have Manage access to edit the data.

As a default, if data has been added to the interpretation project, it will be kept in the project whether it lies outside or inside the AOI. This button allows you to determine whether data outside the AOI should be kept in the project or not.

Loading Data into an Interpretation Project

Loading data directly into an interpretation project instead of its project database is allowed, but *not recommended* as a general practice. Loading data into the project database allows the project's data to be managed as a cohesive whole. Data loaded directly into an interpretation project cannot be managed outside of the interpretation project.

Deleting 2D Lines and All Dependent Data

This section describes how to delete a 2D line and all its dependent data. Before you proceed, be sure that the line and its data you are about to delete are truly obsolete.

If you delete a survey or line from the database, all dependent data is also deleted. To recover a survey, you must recreate it and reload its data. After recovering a survey, you can recover the lines associated with a survey. See the *OpenWorks Online Help* topic *Recovering Deleted Surveys and Lines* for more information.

Deleting Surveys and Lines

To delete a 2D line and all its dependent data in Seismic Data Manager from an OpenWorks project:

1. Select **View > 2D**.

2. Select the name of a survey in the 2D Survey tab in the upper left pane. The 2D lines associated with the survey, if any, are posted in the 2D Lines table in the lower left pane.

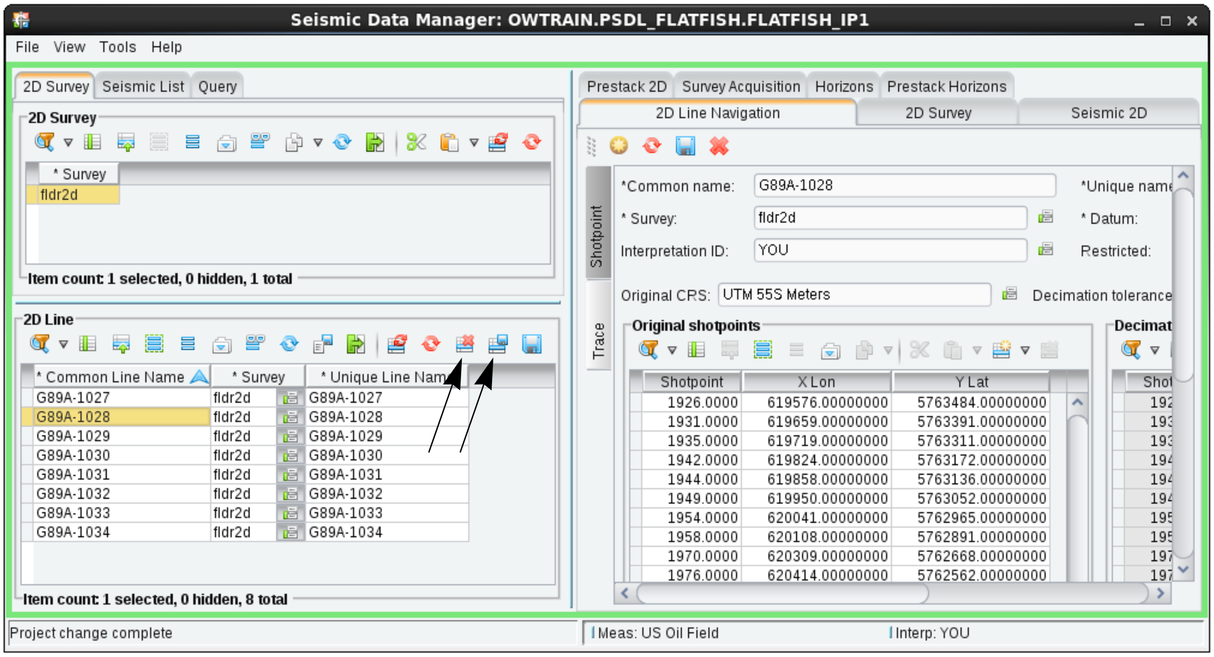
3. In the 2D Lines table, select one or more 2D lines to delete.

    - To select one 2D line, click the line name.

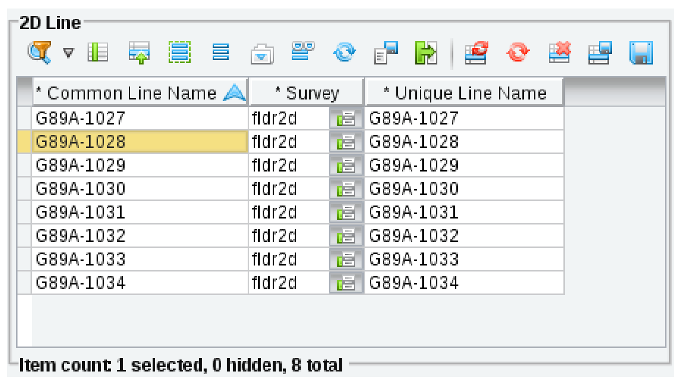
    - To select adjacent lines, use **Shift+MB1** as you click the line names.

    - To select lines that are not adjacent, use **Ctrl+MB1** as you click the line names.

    - If you want to deselect a line name, use **Ctrl+MB1** as you click the line name.



In detail:



4. Click the **Delete selected Seis 2D Line** icon ( ) above the 2D Lines table. The text in the rows describing the 2D lines becomes red. This change has not been committed to the database.

5. To commit the change to the database, click the Save Selected Rows ( ) or Save All Rows icon ( ) above the 2D Line table. The *Confirm Deletion* dialog box displays.

6. Click **OK** in the dialog if you are sure you want to delete the 2D lines and their data. If you click *Cancel* instead of *OK*, the line will not be deleted.

Deleting Interpretation Projects

If you have been assigned the OW_Administrator role in the OpenWorks instance, and if you have Manage access to an interpretation project, you can delete the project.

Deleting an interpretation project removes the project from the project database. Removing an interpretation project removes its references to data shared with other projects. The project cannot be recovered after deletion.

When you delete an interpretation project, you remove the following:

- Lists (well, seismic, lease, and other lists)
- Any seismic shifts or variable misties created in the project
- Interpretation sets

Workflow to Delete an Interpretation Project

To delete an interpretation project with Project Administration:

1. Log on as an OpenWorks user with the OW_Administrator role in the OpenWorks instance.

2. Start Project Administration: from the OpenWorks command menu, select **Project > ProjectAdmin**.

   The Project Administration window displays.

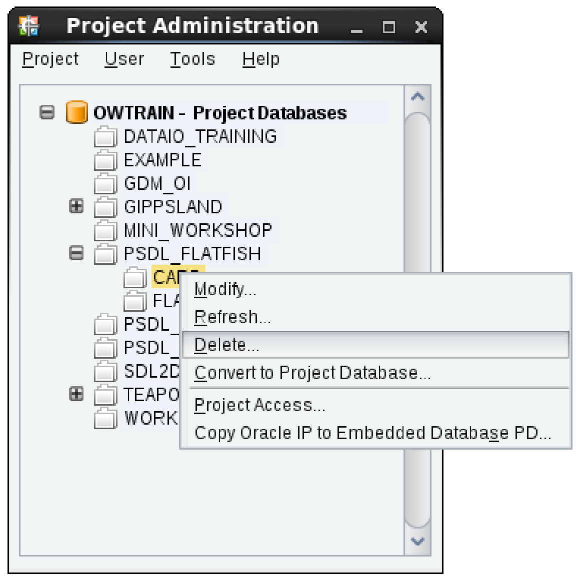
3. Select the name of an interpretation project in the Project Administration window. You must have Manage access to delete the project.

4. Select **Project > Interpretation Project > Delete**.

   The *Delete Interpretation Project* dialog displays. The dialog asks you to confirm that you want to delete the project and all of its interpretation data.

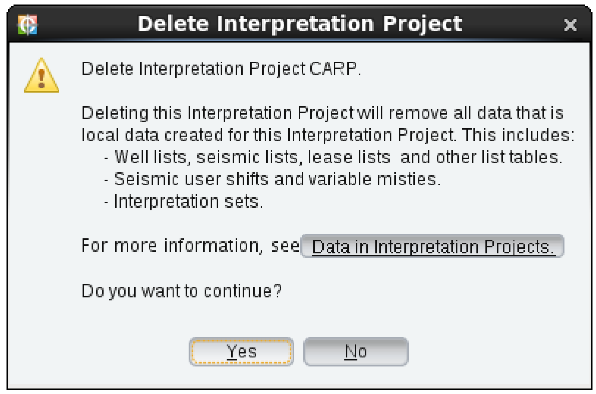
   The data cannot be recovered after deletion.

> **Note**
>
> If the project is in use by another user, the project cannot be deleted.



5. Click **Yes** to start the deletion process.

Another *Delete Interpretation Project* dialog displays with a progress bar. When the deletion process is completed, the dialog will disappear. The project name disappears from the Project Administration window, and the project data are removed from the OpenWorks instance.



Warning
Deleted Projects cannot be recovered. You cannot restore a deleted project unless you have backed it up.

Deleting a Project Database

Even when an interpretation project is deleted, the OpenWorks project that is associated with the interpretation project remains and must be separately removed using the OpenWorks Project Admin utility.

You must have been assigned the OW_Administrator role in the OpenWorks instance, and also have Manage access to the project database to delete it.

When you delete a project database, the project and all associated data and references, including any interpretation projects created from the project database are removed.

To delete a project database with Project Administration:

1. Log on as an OpenWorks user with the OW_Administrator role in the OpenWorks instance.

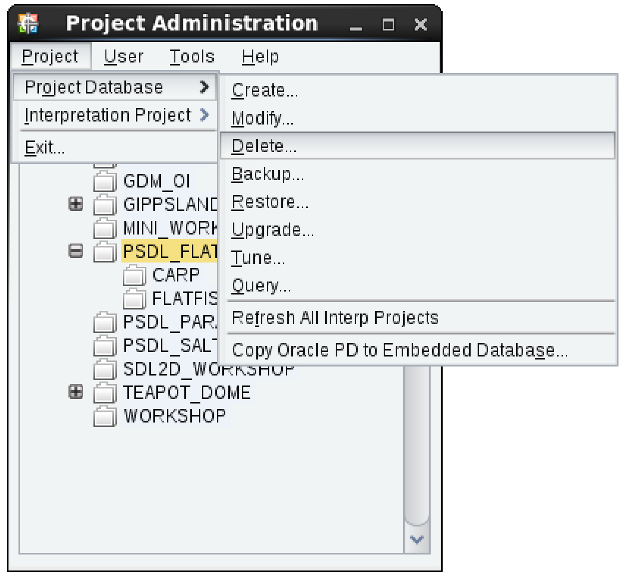
Start Project Administration.

2. From the OpenWorks Command Menu, select **Project > Project Administration**.

The Project Administration window displays.

3. Select the name of a project database. You must have Manage access to the project database.

4. Select **Project** > **Project Database** > **Delete**.



The *Delete Project* dialog displays. The dialog asks you to confirm that you want to delete all data in the project, including all interpretation projects subsetted from the project database.

The data cannot be recovered after deletion.

Note

If the project is in use by another user, the project cannot be deleted.

5. Click **Yes** to start the deletion process.

   The *Deleting Project Database* dialog displays with a progress bar and a message box, indicating what is being deleted.

   If you check the *Close This Dialog When Completed* box, the dialog will close when the deletion process ends.

   The *Details* button allows you to view information about the deletion process. This button toggles between *Details* and *No Details* should you not want to view this information.

6. When the *Deleting Project Database* dialog reports the process has completed, click **Close**.

The project name disappears from the Project Administration window, and the project data are removed from the OpenWorks instance.

Interpretation Data Manager

Interpretation Data Manager is the OpenWorks utility that enables you to view, add, edit, and delete interpretation data stored in an OpenWorks project. Interpretation data displays in tables of data from the OpenWorks instance. Each data form contains information from interpretation data groups - such as fault data, grid set data, or point set data - allowing you to focus on just the data you need.

You can view the following data groups in Interpretation Data Manager:

- **Application Data:** identifies the data associated with an application.
- **Contour Set:** manages the header for a set of contour lines.
- **External Data Object:** information about a logging tool.
- **Fault:** descriptive information pertaining to a fault.
- **Fault Center Line Set:** information about a map view center line representation of all the faults that cross a particular surface.
- **Fault List:** descriptive header information for a working set, or list, of faults.
- **Fault Plane:** header table for a SeisWorks® fault model. This table relates a triangulated fault model and the control points and segments from which it was created.
- **Fault Segment:** header table representing a poly-line along which the fault was picked.
- **Fault/ Surface Grid:** manages the header information for a grid.
- **Geo Shape Set:** manages the data for annotations and remarks created in the DS Base product or the EarthModeling module.
- **GeoShell:** GeoShells are closed-body objects created using the GeoShell Builder in GeoProbe and are most often used to define salt bodies.
- **Georeferenced Image Catalog:** displays the Georeferenced_Image_Catalog table.

- **Grid List:** the descriptive header information for a working set, or list, of grids.
- **Grid Set:** identifies a group of grids.
- **Grid 3D:** (Grid_3D and Grid_3D and Grid_3D_All tables) contains information for 3D grids in earth models. The related OpenWorks tables are: Grid_3D_Interval_All and Grid_3D_Layering_All.
- **Gridded Velocity Model:** information about three-dimensional volumes defined on a regular grid.
- **Horizon List Header:** descriptive header information for a working set, or list, of horizons.
- **Hybrid Velocity Model:** three-dimensional volume splicing together various representations with a structural framework.
- **Interpretation Note Classification:** displays the INote_Classification table.
- **Interpretation Note List Header:** descriptive header information for a working set, or list, of Interpretation Notes.
- **Interpretation Set:** Interpretation Sets group certain data into sets representing an interpretation scenario and capture the necessary version information, history, and relationships into one logical collection. Examples of data that can be associated with an interpretation set are: Seismic, Horizons, Faults, computed grids, contours, Well pick lists and source priority, Curve sets (specific versions of a log run), Velocity models, Polygon sets, ZGF overlay (new gravity, sensing, etc.). Interpretation sets have no datum and Z values associated with them.
- **Interpretation Study:** Interpretation Study is a child of an Interpretation Set and contains information about the different interpretation data (iset), field, basin geologic area, and primary interpreter that created the specific study.
- **Mapping Poly Set:** information about a map view polygon representation of all the faults for a particular surface map.
- **Mdm Mime Set:** displays the Mdm_Mime_Type table.
- **Point Set:** manages the header information for a point set.

- **Pool Volume Analysis:** header table for the volumetric analysis of hydrocarbon pools.
- **Principal Component Analysis:**
- **Seismic 3D List:** list of 3D Seismic datasets.
- **Seismic List:** list of 2D lines.
- **Shift Header:** defines a seismic shift that will be applied to seismic geom sets.
- **Structural Model:** top level table representing a 3D structural model - a structural model consists of a fault network defining the geometry and topology of an intersecting set of faults and the geometry and topology of a set of surfaces intersected by the faults.
- **Triangulated Velocity Model:** displays the Interpolated_3D_Volume table.
- **Vc Pick Surf Name:** provides the name of a formation top or a horizon.
- **Vc Strat Unit Name:** provides the name and alias, or alternate name, for a stratigraphic unit
- **Vertical Image File:** displays the(Vertical_Image_File table and has no related OpenWorks tables.
- **Xyz Function Set:** displays the Xyz_Function_Set table
- **Volumetric Analysis:** provides the summary information of a Volumetric Analysis on a Pool or Lease. The related OpenWorks table is Volumetric_Alys_Result.

> **Note**
>
> To see the columns or fields in a table and for other information about the table, see the OpenWorks Data Model.

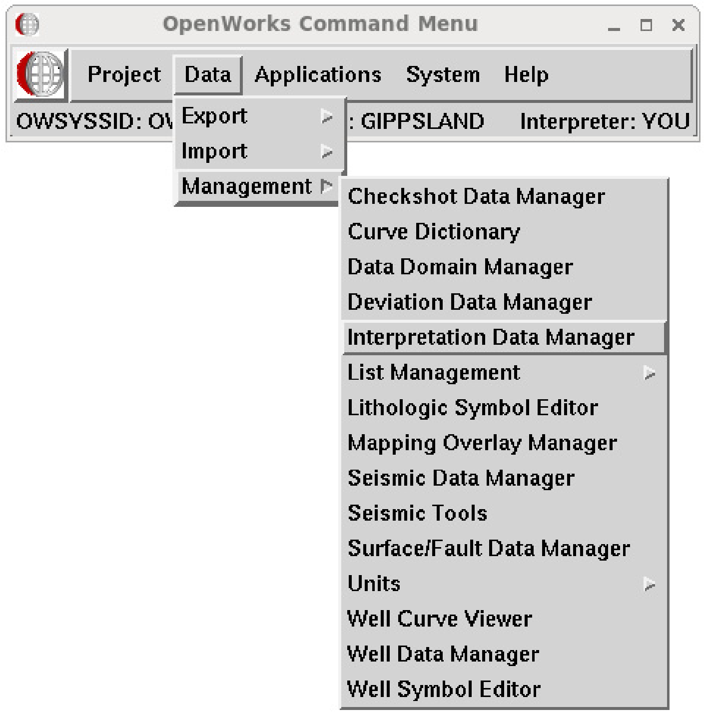
Launching Interpretation Data Manager

Interpretation Data Manager must have the following OpenWorks session parameters set before displaying. If they are not, the utility will prompt you to set them.

- OpenWorks project
- Measurement system
- Interpretation ID

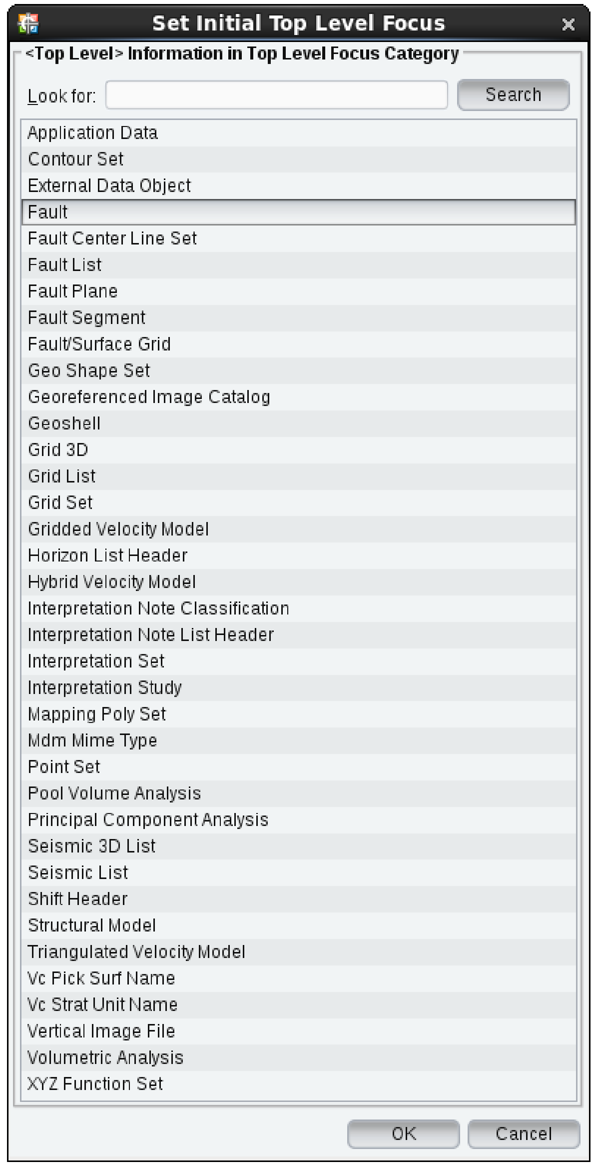
To launch Interpretation Data Manager, do the following:

In the OpenWorks command menu, select:
Data > Management > Interpretation Data Manager

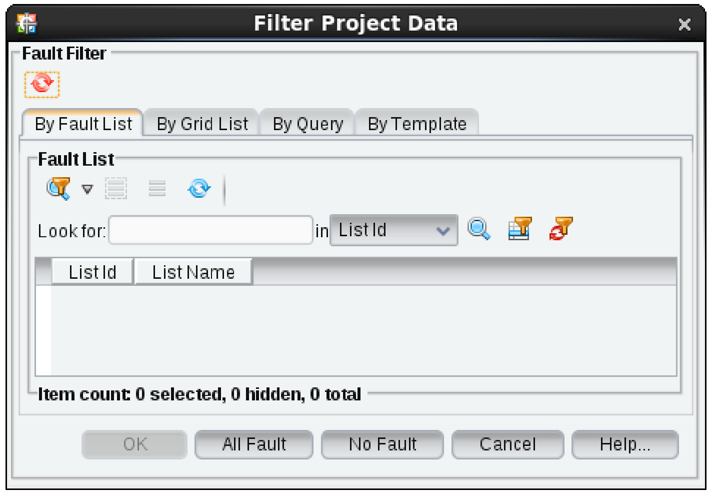


General Workflow

1. Set the Top level focus for the data type you want to view or manage (this example uses *Fault* for the focus):



2. Next, select all the data of that type or filter to get the data desired.



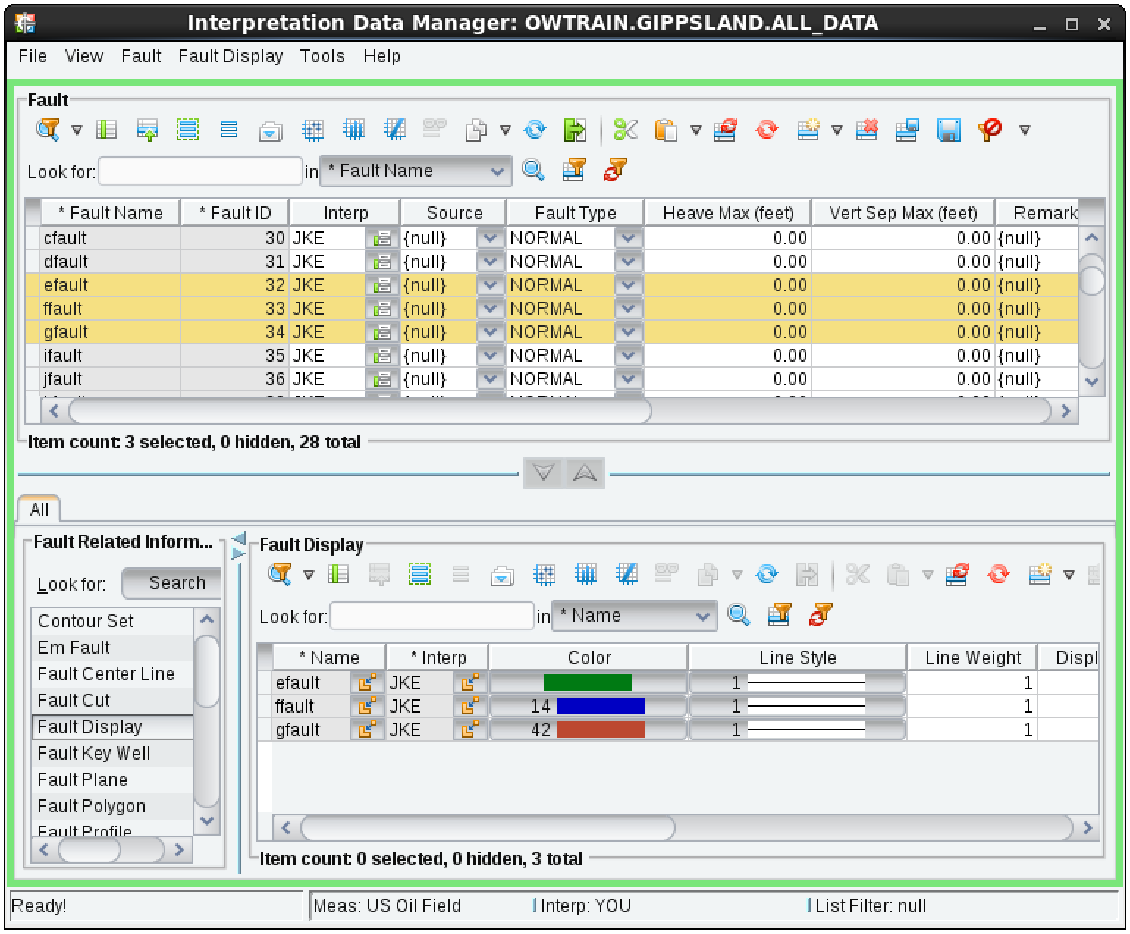
The *Filter Data* dialog box allows you to limit the data that an OpenWorks application retrieves from the OpenWorks database instance. Some types of data have masses of data which, if all are retrieved from the database, may take a long time to retrieve. Also, you may only be currently interested in some of the data. The *Filter Data* dialog box allows you to more efficiently retrieve the data you are interested in.

The basic form of the dialog has two tabs: *By Query* and *By Template*. Depending on the data that is being filtered, the dialog may have more tabs.

For example, for Fault data, the dialog adds the By Fault List and the By Grid List tabs, for well header data, the dialog adds the By Well List and the By Lease List tabs, and for field prospect data, the dialog adds the By Well List and the By Field List tabs, but for lease data and well location data, the dialog adds only the By Lease List tab.

The Interpretation Data Manager window displays data for the selected focus type.

3. Select one or more data item(s) and then select desired information type in the related information list to view.



Customizing the Interface

Selecting Focus on Related Data in Interpretation Data Manager

Interpretation Data Manager allows you to look at data in its upper pane and to look at related information in its lower pane. By selecting items in the left, lower pane, and clicking the *Shift Hierarchy Up* ( ) and *Shift Hierarchy Down* buttons ( ), you can look through the hierarchy of data related to the data given the top level focus in Interpretation Data Manager.

To focus on information related to data displayed in the upper pane:

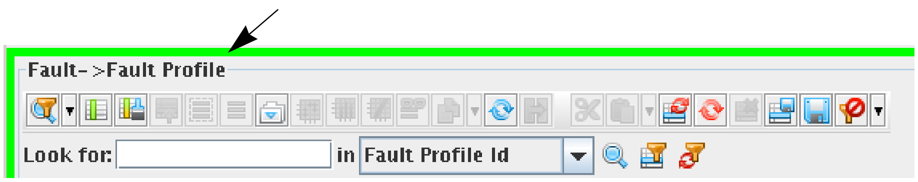
1. Select an item in the left, lower pane. If the *Shift Hierarchy Up* button (up arrow active) between the upper and lower panes becomes active, the item has related information.

2. If the table has related information, click the *Shift Hierarchy Up* button.

   The following happens:

   — The table in the lower pane moves to the upper pane.

   — The *Focus* information line indicates the new hierarchy of data in the upper pane. For example, if the Fault table were in the upper pane, and if the Fault Profile item was selected when the *Shift Hierarchy Up* button was clicked, the line would appear like the following:



   — The left, lower pane lists the tables related to the table now in the upper pane.

3. Click an item in the left, lower pane to display its related information.

Create a Customized Category Selection Tab in Interpretation Data Manager

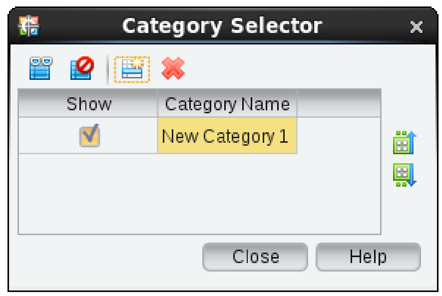
The list of categories in the related information selection may be customized to suit your needs. You might want to do this if the list is long and/or you are only interested in certain pieces of information. The full list tab will still remain an option, but you can create a new tab with just the categories you want to see.

To create a new tab (category of related information) in Interpretation Data Manager, do the following:

1. Select **File > Select Categories…**

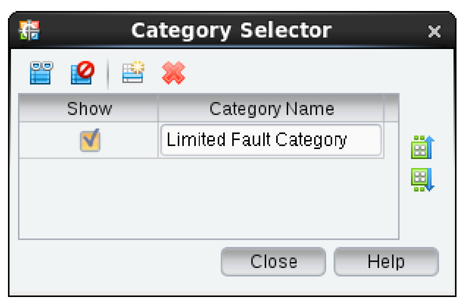
2. In the dialog, click the **Create Category** icon ().

   A new row appears in the list box, and a new tab appears in the lower pane. The category and tab name of a newly created category is New Category n, where n is a number.



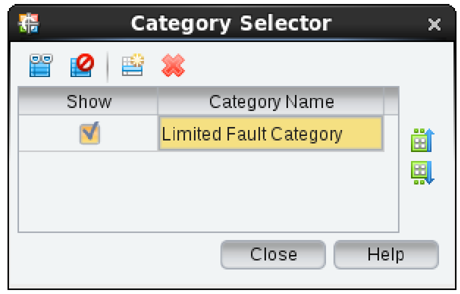
3. Double-click the Category Name cell of the new row.

4. Change the name of the category to a name that describes your new category.



5. Press the **<Tab>** key (or click in another cell in the Category Selector table) to select another cell. After you select another cell,

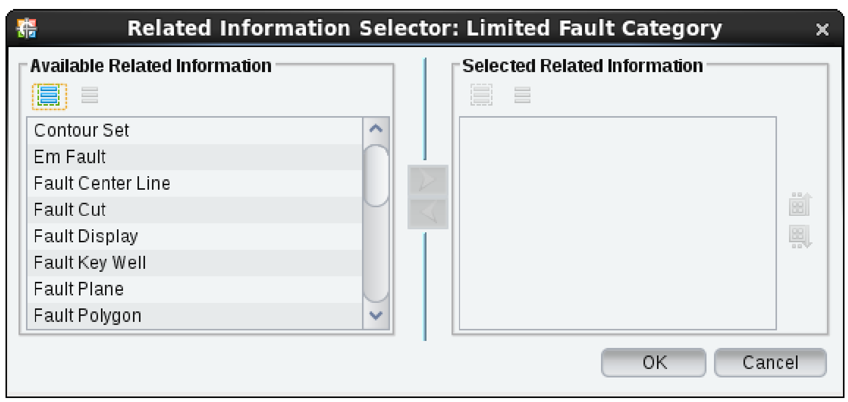
the box in the *Show* column should still be checked in order for the tab to display in the lower pane.



6. Click **Close**.

   You have just created a category name. Now you need to add the categories you want to display in the data related information list.

7. Highlight the new category tab and click the *Customize related information* button ( ) to display the *Related Information Selector* dialog box.



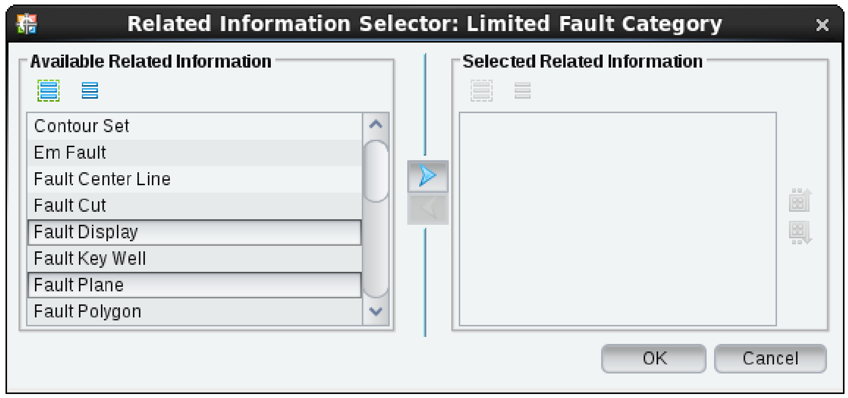
8. In the left pane of the dialog, select the names of the related tables that you want available in the tab. You may select items in the following manner:

   — Contiguous Selection: Hold the Shift key down while selecting the beginning and ending rows of the selection with the mouse.

— Discontiguous Selection: Hold down the Ctrl key while selecting rows with the mouse.

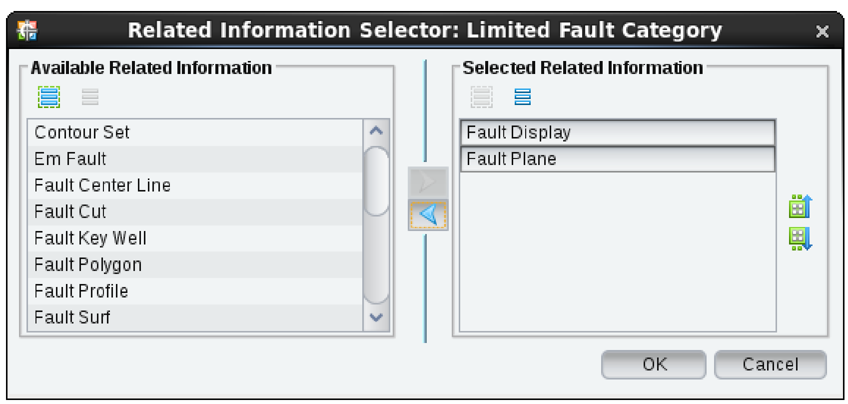
— The Select all related information icon ( ) selects all items in the list box.

— The Unselect All Related Information icon ( ) unselects any selected items in the list box.



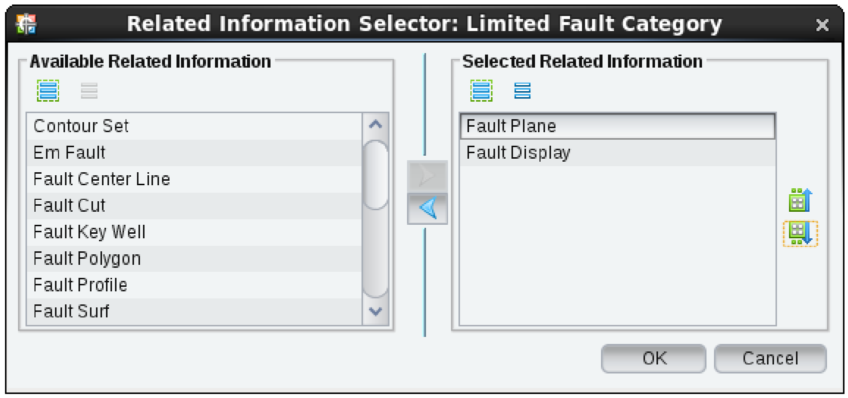
9. After you have selected items in the left pane, click the *Add to selected related information* button ( ).

   The selected items will appear in the Selected Related Information list box in the right pane.



Select items in the left and right panes, and using the *Add related information* and *Remove from selected related information* arrow buttons allow you to refine the list of table names in the Selected Related Information list box.

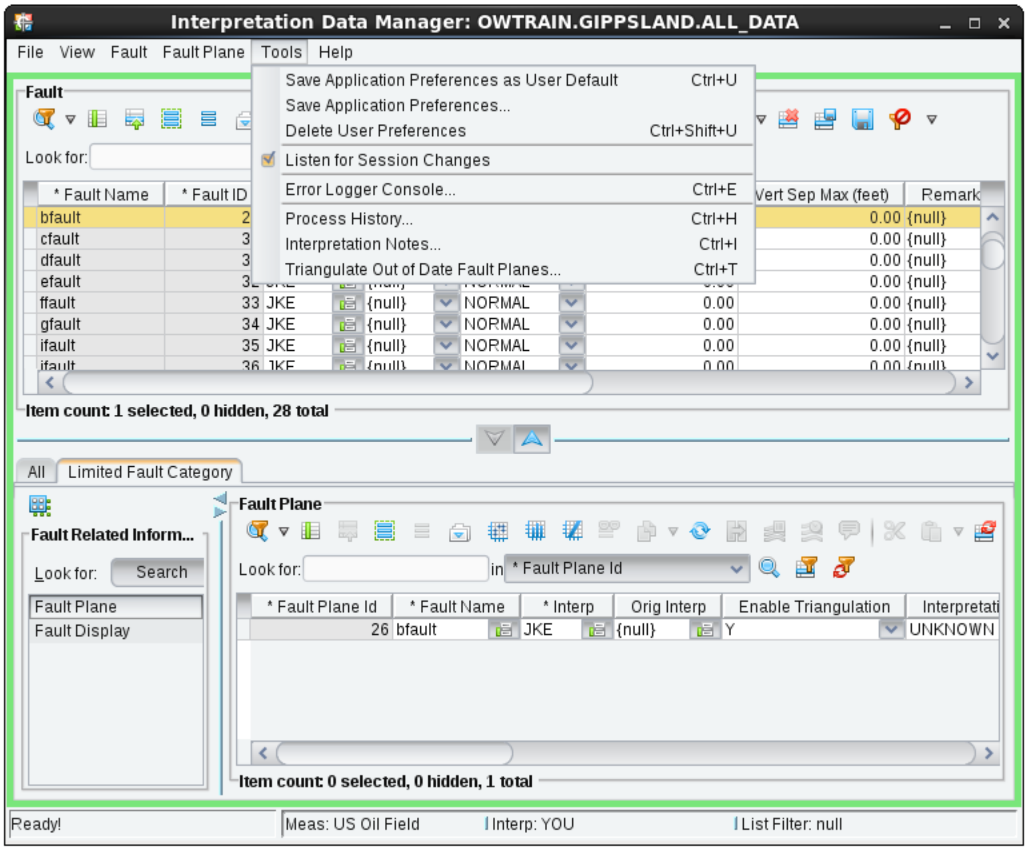
10. To reorder the list of items in the right list box, select one or more items, and click the *Move selected related information up* ( ) and *Move selected related information down* ( ) buttons to move the items higher or lower in the list of table names.



11. After you have selected and arranged the list of items, click **OK**.

    The dialog closes, and the list of table names appears in the left pane of the tab.

12. Select **Tools > Save Application Preferences as User Default** to save the column selection and arrangement.



Deleting Interpretation Data

Interpretation Data Manager allows you to delete interpretation data in top level tables and in their related tables. Depending on the parent data type that you delete, OpenWorks software may remove all child records associated with the interpretation data, or may prompt you to first delete the associated child records of the parent data type. You can also choose to delete just a selected child record that is associated with interpretation data.

To delete an interpretation data record:

1. Select the item you want to delete.

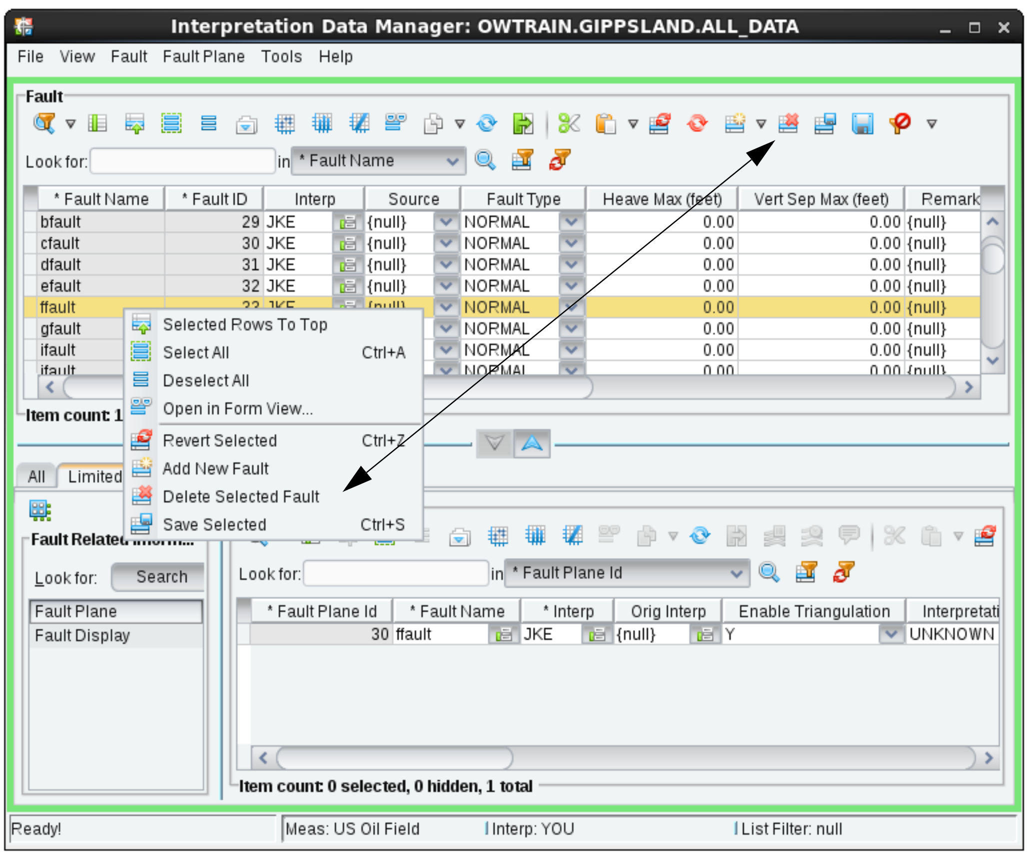
   - To delete a top level table record, click the data row you want to delete from the list box in the upper pane of Interpretation Data Manager.

   - To delete a data row from a related table, first select the top level data group row. Then in the lower pane, choose the related table from which you want to delete a record and select the data to delete in the bottom right pane.

2. Deleted the selected data using one of the following procedures:

   - Select the Delete selected *DataGroup* option from the menu bar or click the *Delete selected* button ()

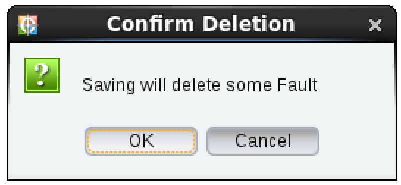
   - Right-click on the row and select the *Delete* option from the shortcut menu



The row details display in red and the delete icon ( ) indicates that the row is marked for deletion.

If you want to undo a deletion, click the *Revert all rows* icon ( ).

3. To commit the change to the database, click the *Save selected rows* icon ( ), or click the *Save all rows* icon ( ) to save all changes. A confirmation message displays.



4. Click **OK**. The selected data is deleted from the database.

SeisWorks Data Transfer

SeisWorks Data Transfer may be used to copy seismic and horizon data from 3D survey to 3D survey or 3D survey to 2D lines.

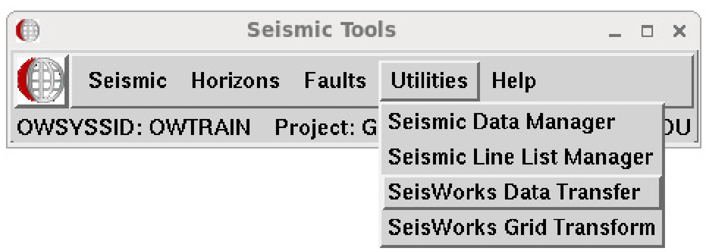
When transferring data to 2D lines, you must first transfer navigation information to define the 2D lines.

The advantage in using this utility is that you can accomplish a data transfer by pushing only a few buttons. The disadvantage is that the projects must have the same cartographic reference system (use Project Data Transfer instead for projects with different cartographic reference systems).

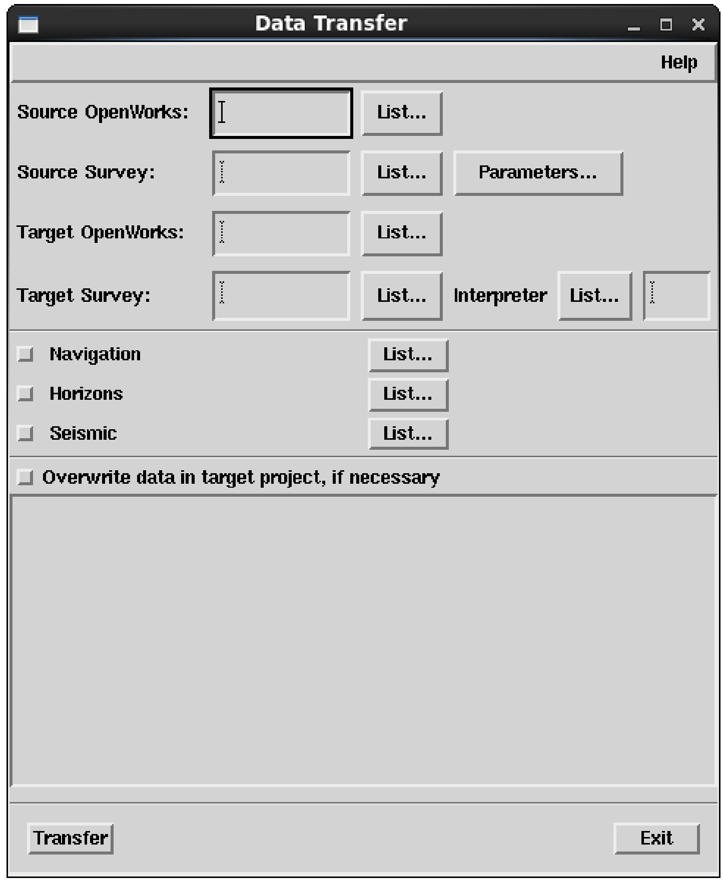
Workflow example Using SeisWorks Data Transfer (Swdt)

Access the utility using one of the following two methods:

- Type `Swdt` at the command line in a terminal window
- Select **SeisWorks Data Transfer** from *Utilities* in the Seismic Tools command menu (available in the OpenWorks launcher under **Data > Management > Seismic Tools**)



After accessing this utility by either of the methods above, the *Data Transfer* dialog box displays.



Select the source OpenWorks project and survey where you want to copy the data from and then specify the target project and survey where you want the data to go.

SeisWorks Data Transfer does not convert cartographic reference information, so use this utility only if the source and target projects have the same CRS, otherwise use another transfer option such as Project Data Transfer describe next in this chapter.

1. Click the **List...** button next to *Source OpenWorks* in the *Data Transfer* dialog box.

   The *Input Selection* dialog box displays.

2. Highlight a project, and click **OK**. The project name appears in the *Source OpenWorks* text field of the *Data Transfer* dialog box.

3. To choose a *Source* Survey click **List...** and select from the resulting *Input Selection* dialog box. Click **OK**.

   Your choice appears in the *Source Survey* text field.

4. To choose the *Target OpenWorks*, click **List...** and select the project in the *Output Selection* dialog box.

5. Click **OK** in the *Output Selection* dialog box.

   Your choice appears in the *Data Transfer* dialog box.

6. To choose the *Target Survey*, click **List...** and select a survey from the *Output Selection* dialog box.

7. Click **OK** in the *Output Selection* dialog box.

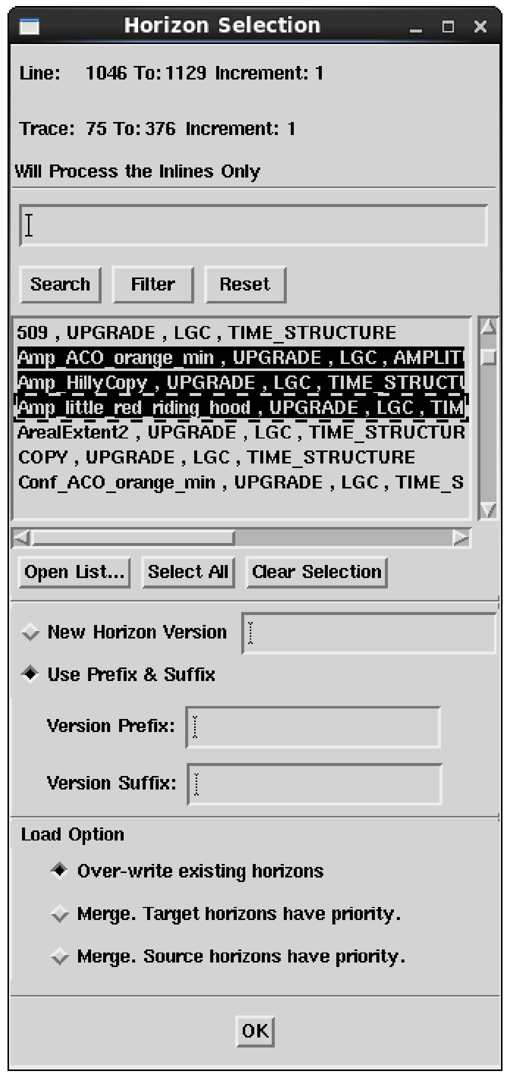
Your choice appears in the *Data Transfer* dialog box.

At the same time, the name of the Interpreter associated with the Target Survey appears in the Interpreter text field. If you want to select a different interpreter, click the **List...** button and choose from the *Interpreters* dialog box.

In this example, three horizons are selected for transfer.

8. Toggle **ON** Horizons.

9. Click **List…** to select the desired horizons to transfer.



The top of the dialog box lists the lines, traces, and increments involved in the transfer. It also tells you that the software is transferring the data in an inline order.

Use the **Search/Filter/Reset** buttons to find the horizons you want to work with. Select one or more horizons. Click on the horizons individually, or use **Select All...** to transfer all of the horizons.

To clear a selection, click on the **Clear Selection** button.

You can give the horizon a new version or add a version prefix or suffix to the horizon name. Do not change the version if you are just transferring horizons from one interpretation project to another.

> **Special Note**
>
> If you add a Version Prefix or a Version Suffix to a horizon name, and those additions make the horizon name longer than 60 characters, the software may truncate the horizon name. Horizon names are limited to 60 characters.

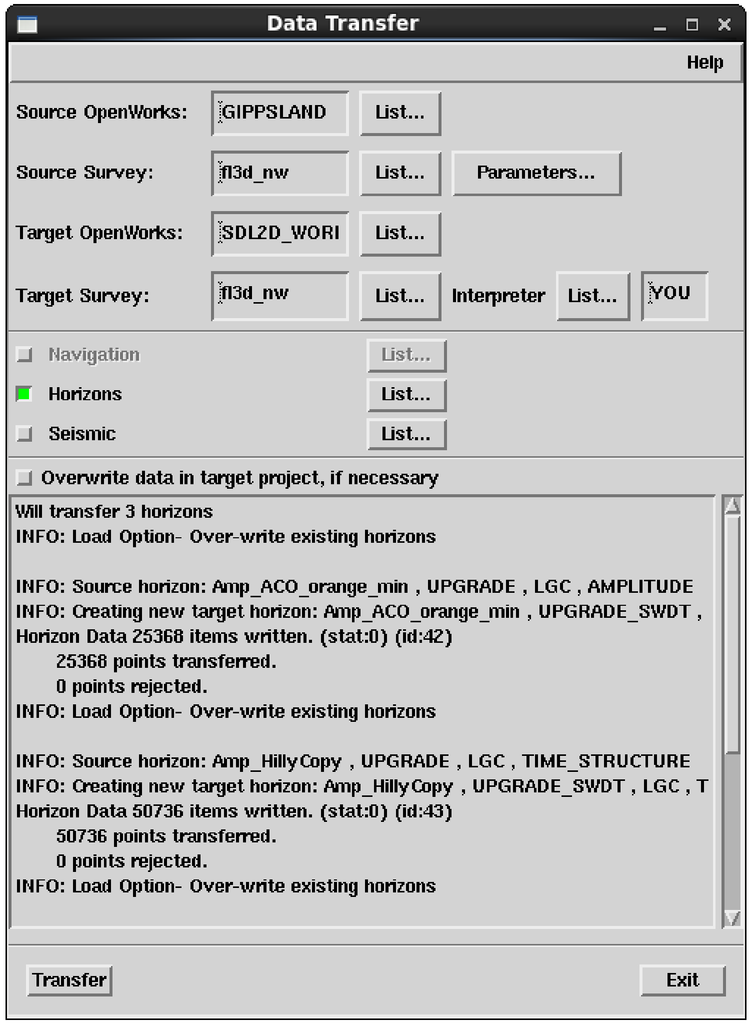
Three load options are available when the same horizons are in the source and target projects:

- Over-write existing horizons
- Merge horizons (keeping target horizons unchanged)
- Merge horizons (keeping source horizons unchanged)

10. Click **OK** when you have made your selections.

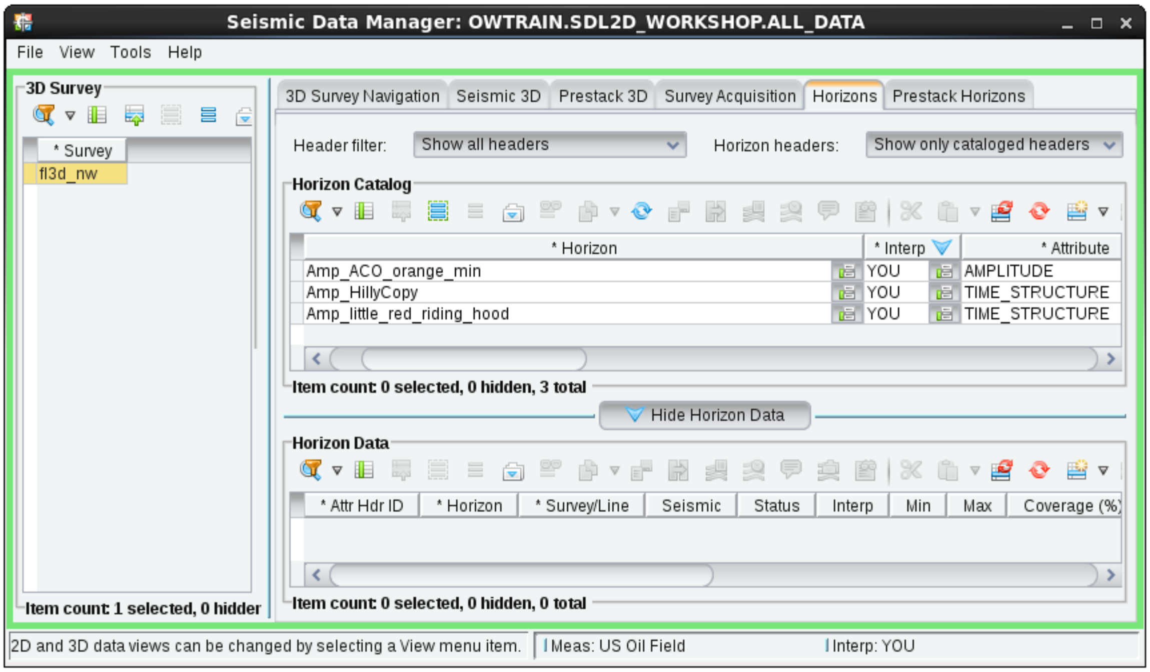
11. Return to the *Data Transfer* dialog box, and click **Transfer**. The panel in the bottom half of the dialog box and a progress bar that appears briefly reflect the progress of the data transfer.

> **Option 'Overwrite data in target project, if necessary'**
>
> By default, this option is turned off in the *Data Transfer* dialog box. If you turn it on before you make a transfer, data with the same name as the data in the target project will be overwritten in the transfer.



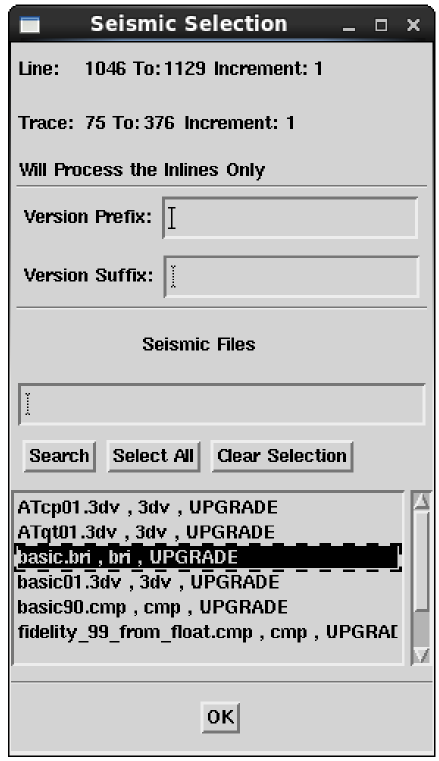
12. After the transfer is complete, review the import information in the dialog and click **Exit**.

13. Check the horizons in the target project by opening Seismic Data Manager and selecting the survey and the Horizons tab.



Steps for Selecting Seismic Data for Transfer

Seismic data files may be selected in similar way. In the *Data Transfer* dialog box and toggle **ON** *Seismic* click **List...**.



The top of the selection dialog box lists the lines and traces involved in the transfer. It also tells you it will process the inlines only.

- Make your selections by clicking the seismic volumes one by one. Use the **Select All** key to select all of the seismic volumes in a panel. To deselect a seismic volume, click on it or on the **Clear Selection** pushbutton.

- If you want to search for a specific seismic volume, type the first few letters of the name in the text field of the appropriate panel and click the **Search** button.

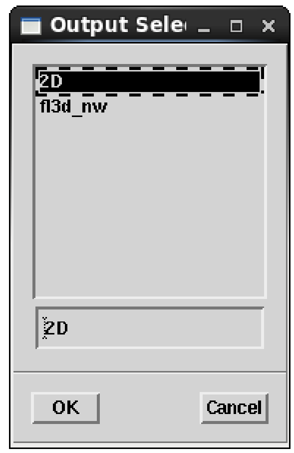
- When you have made your selections, click **OK**.

Using 2D Lines as Targets

When transferring horizons or seismic to 2D lines, you must provide information to define the lines. Follow these instructions to complete your transfer:

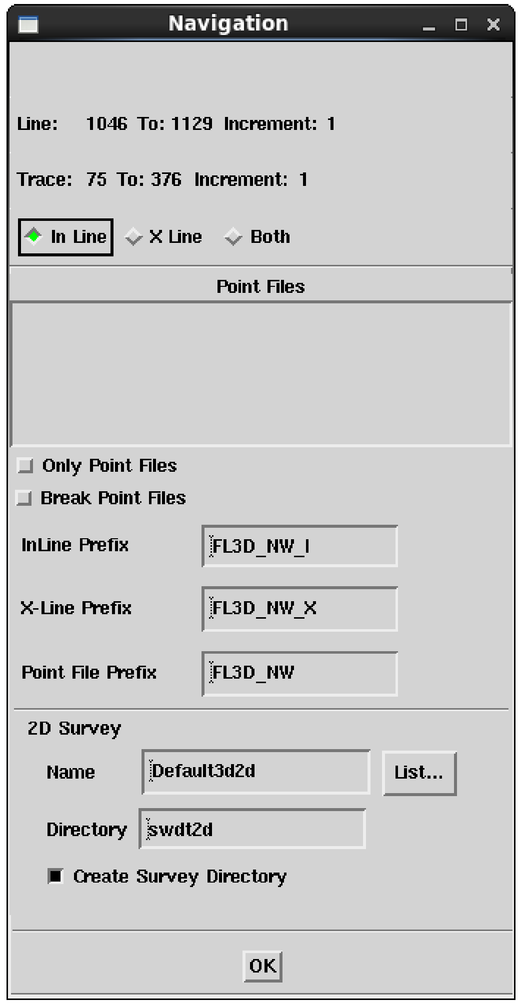
1. In the *Data Transfer* dialog box, click **List...** for *Target Survey*.

2. When the *Target Survey* dialog box appears, select **2D lines**, and click **OK**.



The 2D lines name appears in the Target Survey text field of the *Data Transfer* dialog box.

3. Note that the **Navigation** check box in the *Data Transfer* dialog box is now available. Toggle on the box and click **List...** to open the *Navigation* dialog box.



The top of the *Navigation* dialog box shows the lines and traces you are transferring. This part of the dialog box also displays the increment by which you transfer these lines and traces.

4. By default, *In Line* is toggled on at the top of the box. This option means you are transferring only inlines. You can decide to transfer only crosslines by toggling on *X Line*. Or, you can transfer crosslines and inlines by selecting *Both*.

   If you select *Both*, the Swdt utility uses all traces per incremented inline and crossline. The current increments are displayed at the top of the *Navigation* dialog box. You can change them in the *Parameters* dialog box.

You can use point files, either in addition to inlines and crosslines, or in place of them. If you want to use point files instead of inlines or crosslines, toggle on Only Point Files in the *Navigation* dialog box. Then, **Inline**, **Xline**, and **Both** become unavailable at the top of the dialog box.

Click to select a point file for use.

5. If the point file contains two much data for an effective transfer, you can toggle on **Break Point Files** so that the lines in each point line are transferred one by one.

Why use point files?

Point files allow a specific set of traces along a 2D line or a set of traces along an arbitrary line to be transferred. For example, you may want to use an arbitrary line defined by a point file to trace a well path or to look at a formation that is in a different orientation from where the 3D line was shot.

6. In the bottom half of the *Navigation* dialog box, the software shows the names for the *InLine Prefix*, *X-Line Prefix*, and the *Point File Prefix*.

   The character strings shown here will be used to name the 2D lines generated. For example, if the string NEWFL3D-I is specified in the *InLine Prefix* box, then the 2D line generated when line 250 is output would be NEWFL3D-I250.

7. A default name appears in the **Name** text field. If you want to change it click on **List...** and select a name from the *2D Surveys* dialog box. The new name appears in the Name text field.

   The output survey is the name of the 2D survey in the current OpenWorks interpretation project, which will hold the newly created 2D lines.

8. If you want to create a new directory for the new 2D survey, type the name into the Directory text field.

9. By default, the **Create Survey Directory** box is toggled on. The utility will create a directory for the new survey after you approve your selections in the *Navigation* dialog box and initiate the transfer in the *Data Transfer* dialog box.

10. Click **OK** in the *Navigation* dialog box.

> **Feet/meter conversion**
>
> When projects in feet are transferred to projects in meters and vice versa, the Swdt utility performs a conversion to make the units the same.

Return to the *Data Transfer* dialog box.

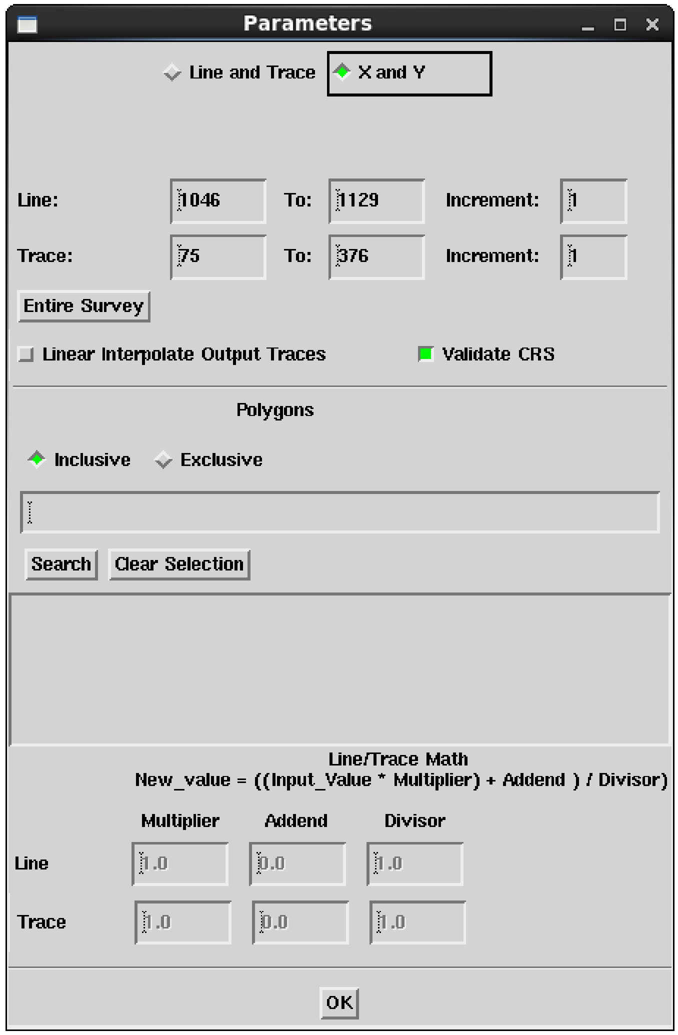
11. Click **Transfer** to complete the data transfer.

Setting Parameters for Customizing Data Selection

You can use the previous workflows described when you want to make a straightforward transfer of horizon or seismic data.

To be more specific in your choice of transfer data, and to transfer only certain parts of data, you can specify settings in the Parameters box of the Swdt utility.

1. Click the **Parameters** button in the *Data Transfer* dialog box.



This option's settings depend on whether you are transferring data from one 3D survey to another, or from 3D to 2D:

- In 3D to 3D transfer, **X and Y** is the default. **Line and Trace** is an option.
- In 3D to 2D transfer, **Line and Trace** is the default, and *X and Y* is greyed out. The **X and Y** transfer option is never valid for the 3D to 2D transfer.
- The text fields in the Line/Trace Math panel can be active for a 3D to 3D transfer only. To use the panel, click **Line and Trace** at the top of the dialog box. In all other situations, the text fields are unavailable (greyed out).

- At the top of the dialog box, the default lines and traces for the entire project appear in text fields. To change the data range, type in new values in the line or trace fields. The new values appear in these places:

  —at the top of the *Horizon Selection* and *Seismic Selection* dialog boxes for a 3D to 3D transfer.

  —at the top of the *Navigation*, *Horizon Selection*, and *Seismic Selection* dialog boxes for a 3D to 2D transfer.

Later, if you want to reset back to the survey defaults, click on the **Entire Survey** button in the *Parameters* dialog box.

If you are working with a 3D to 3D transfer, select either **X and Y** or **Line and Trace** for your transfer operation. **X and Y** is the default because most transfers will probably involve overlapping surveys whose grids do not map to one another in a straightforward manner.

If, however, your survey grids map out in a one-on-one relationship, **Line and Trace** may work best for your operation. You may wish to use the Line/Trace Math panel in conjunction with such an operation.

To leave no holes where there is coverage, click the **Linear Interpolate Output Traces** box.

You can specify limits on the data you transfer by using *.dts* files (SeisWorks mapping files), which contain fault polygons. By default, the Swdt utility uses *Inclusive* polygons, but you can select *Exclusive* instead by toggling on the radio button. If inclusive, only data within the polygons is transferred. If exclusive, only data outside the polygons is transferred.

The Line/Trace Math panel offers a way to adjust an existing grid to the transfer of new data. The output line number is calculated as follows:

New Value = ((Input_Value * Multiplier) + Addend) / Divisor)

The same calculation is made for trace values.

2. Complete selections in the *Horizon Selection*, *Seismic Selection*, and, if you are working with a *2D transfer*, *Navigation* dialog boxes.

3. In the *Data Transfer* dialog box, click **Transfer**.

   The panel in the bottom half of the dialog and a progress bar that appears briefly reflect the progress of the data transfer.

Project Data Transfer

Project Data Transfer (PDT) provides a quick method for transferring data from one project to another.

Project Data Transfer has been enhanced to transfer the processing history associated with 2D seismic line and 3D seismic survey data. The new categories are:

- Seismic Data Set Processing History
- Horizon Processing History

OpenWorks captures input and output history information of various seismic data types such as vertical, bricked, compressed formats. It also retains the parameters and processes that were applied to the data when transforming it from input to output data.

When transferring data between two projects in the same Oracle System Identifier (SID), the source project and target project can use different cartographic reference systems (CRSs) and different units of measure. PDT will automatically convert the incoming data to the CRS and units of the target project. PDT will also check and update a CRS with the same CRS name. All CRS_IDs will be updated accordingly. If a CRS located in the source is unavailable in the target, it will be automatically added.

PDT supports data transfer between source and target projects that reside on different OpenWorks databases. OpenWorks synchronizes the cartographic reference and measurement system information with the target database during the transfer. Most of the project consolidation work takes place during this process. PDT can be used to move most of the data from smaller databases into a large regional one, including all well production, list, seismic navigation data, and 2D horizon data.

Another transfer option, the Pack & Go utility moves data types that reside in flat files and that have metadata references to it in the OpenWorks database. It can be used to export 3D horizons and 2D, 3D, and pre-stack seismic data from one project into a format that can be imported readily into the regional database. PDT and Pack & Go should be the only two utilities you need to transfer all data into a regional database.

Transferring Data Across Oracle Instances

You can transfer data between source and target projects that reside on different Oracle instances (OWSYSSIDs) if the projects have the same CRS definitions and measurement system installed.

Access Levels Required

At a minimum, you must have browse access for the source project (since you are only reading data) and limited interpreter access for the target project (since you are writing data).

Types of Data Transferred

A brief synopsis of the data types in the OpenWorks software and I/O methods for this release are provided below.

Data Type	I/O Methods
Non seismic data types (well, production, planning, lists, velocity models, etc.)	• Project Data Transfer • ASCII Loader • Curve Loader • Well Data Export
Seismic navigation data	• Data Export/ Import Wizard • Project Data Transfer
3D Horizons	• Seismic Data Manager ‘Pack & Go’ • SeisWorks Mltimport, Mltexport • SeisWorks Data Transfer utilities • Project Data Transfer
2D and 3D PostStack data (2v2_glb, 3dv, 3dh, bri, cmp format)	• Seismic Data Manager ‘Pack & Go’ • SeisWorks Data Transfer • Seismic Converter • PostStack Data Loader • SEG Y Import/Export
2D and 3D Prestack data	• Seismic Data Manager ‘Pack & Go’
Shift Set Data	• Project Data Transfer

You can transfer seismic data sets and seismic horizons data from one project to another, eliminating the need to manage two sets of files. When the data transfer is finished, both projects will reference the same external files.

You can transfer the following types of data with PDT:

- Basin Data
- Field Data (including production data)
- Lease Data (including production data)
- Facility Data (including production data)
- Wavelet Data
- Well Data (including production data and process history data)
- 3D Seismic Survey Data (including process history data)
- 2D Seismic Line Data (including process history data)
- SeisWorks Fault Data (including process history data)
- Shift Set Data
- Stored Query Data
- Strat Column Data
- Line of Section Data
- Interpretation Data (including process history data)
- Well Template Data
- List Data
- Earth Model Data (including process history data)
- Well Planning Project Data
- Velocity Model Data (including process history data)
- Process History Data
- General Application Data

Do not use PDT with projects that are self-referencing

If either the source project or target project has a standalone CRS, it is impossible to accurately project the *x*, *y* coordinates into the target project.

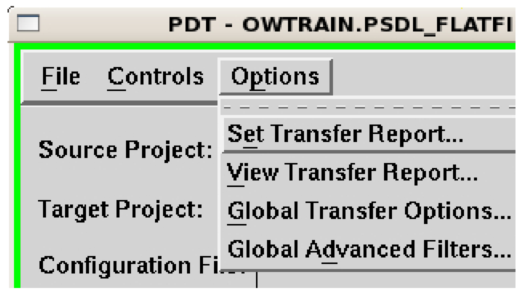
PDT will not stop you from attempting such a transfer, but the coordinates will be meaningless.

If the source or target is self-referencing, PDT will give you the option to choose another project or continue without any cartographic conversions.

Preserve or overwrite existing data

When both projects contain data for a given item, by default, PDT will preserve the data item that already exists in the target project and not load the data item from the source project. However, you can instruct the application to overwrite existing data with incoming data in the *Global Transfer Options* dialog box.

To open the *Global Transfer Options* dialog box, select **Options > Global Transfer Options…**



To further control what data is transferred, you can set the following transfer options, which apply to all data types:

- Overwrite data in target
  - **Off -** Preserves the data item that already exists in the target project. The incoming data item is not written to the target project. This is the default.
  - **On -** Replaces the existing data item in the target project with the incoming data item from the source project.
- Validate source coordinates

  Coordinates for most objects are stored in Preferred coordinates (x, y, lat, lon) and Original coordinates (org_crs_id, org_x_lon, org_y_lat). When this option is selected, PDT will ensure that the original coordinates when converted to the source project's coordinate system match the preferred coordinates. If the original coordinates agree, the original coordinates are used to convert and transfer to the target; if they do not agree, PDT will ignore the original coordinates and use the preferred coordinates when transferring data to the target, making the preferred coordinates in the source the *original* coordinates in the target.

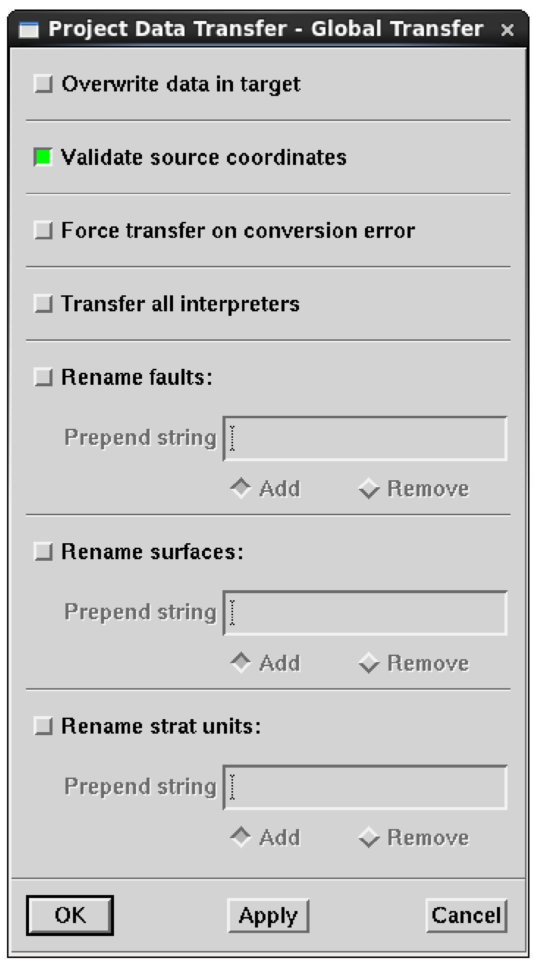
- Force transfer on conversion error

  Indicate whether to force the transfer after encountering a conversion error of any kind by toggling **Force transfer on conversion error** off or on. By default, this option is off: data containing bad conversions are not transferred. Generally, it is not recommended to force a transfer.

- Rename faults, surfaces, and strat units

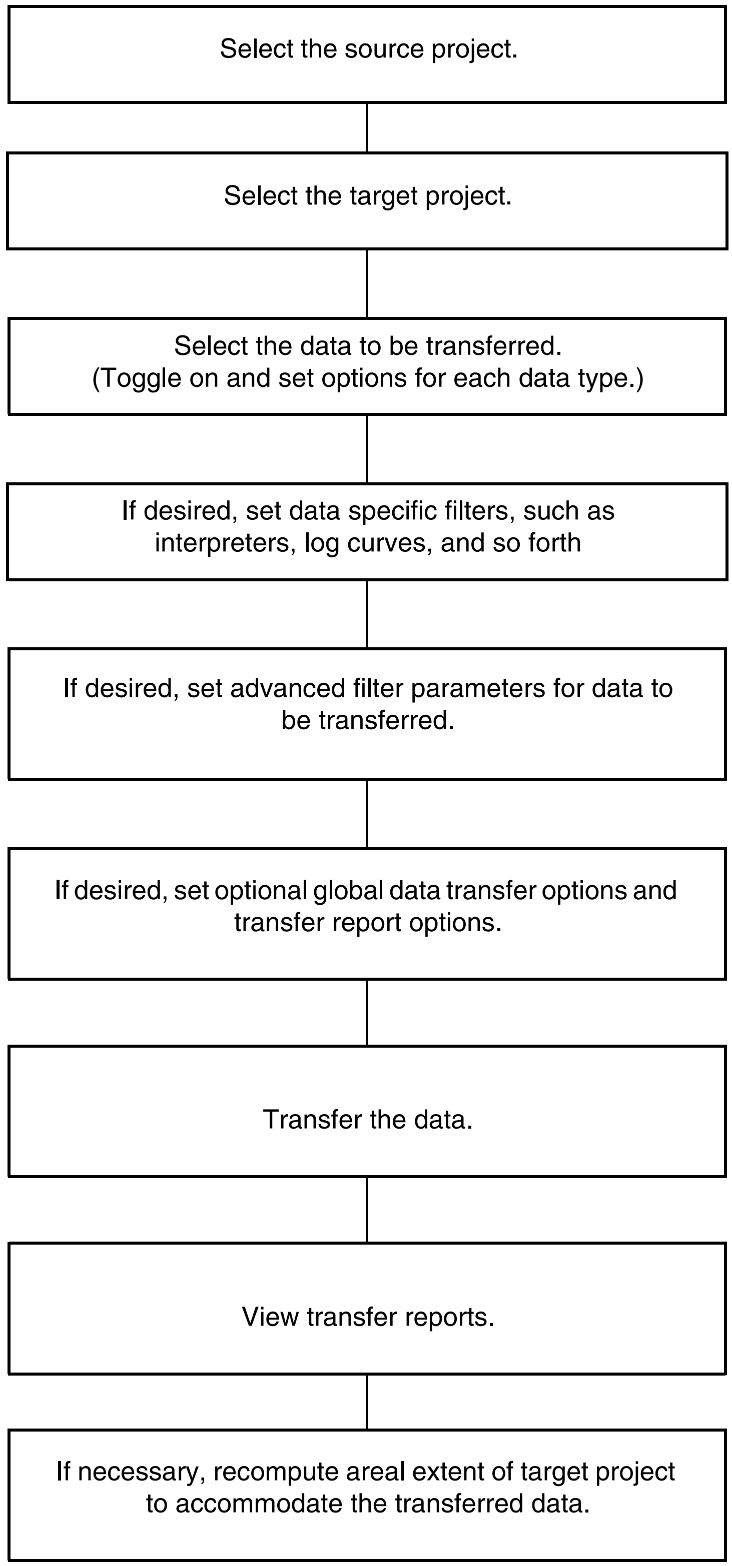
  Project Data Transfer allows you to rename faults, surfaces, and stratigraphic units, when data is transferred to the target project, by prefixing a string to the name of the object. Conversely, you can also remove a string from the name of an object. Even though you are renaming a set of objects (faults, surfaces, or stratigraphic units), each item in the set may be referenced by another record (or related to another piece of data) in the OpenWorks database.

  You must make sure that you maintain data relationships when you transfer the data to the target project.



Typical workflow

A basic work flow for using Project Data Transfer is outlined below.



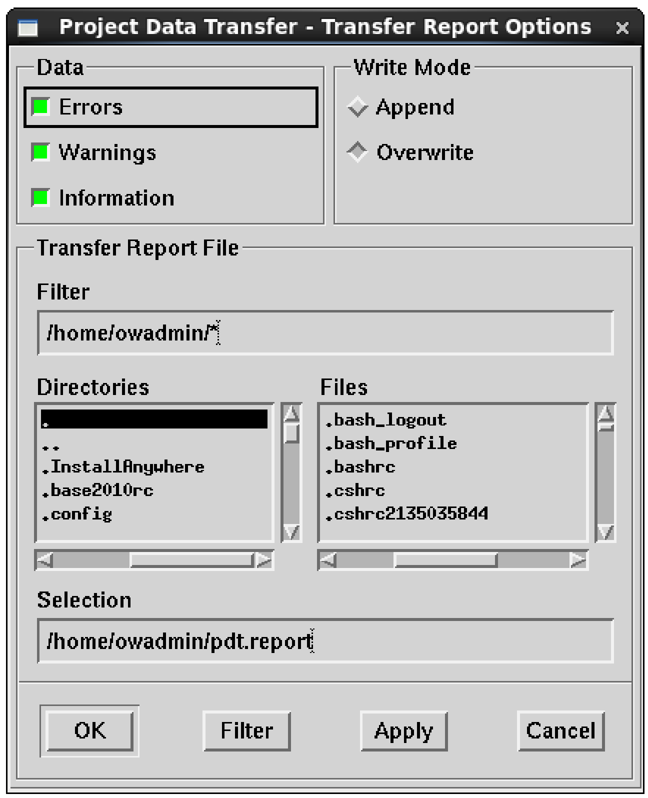
Report options

Whenever you transfer data, PDT generates a report indicating what data was transferred and what, if any, errors were encountered. This report is displayed on screen during the transfer process so you can monitor the progress. It is also written to the file you specify.

You can choose any or all of the following report modes, which present different types of information:

- Errors
- Warnings
- Information

You can also indicate whether you want to append to the previous transfer report file, or to overwrite the existing report file with new information.



Create Embedded Database for Local Projects

With OpenWorks 5000.10, new embedded database support for disconnected use in addition to the standard enterprise support for an Oracle database.

The embedded database is an alternative database platform with SQLite. You can administer projects and data in an embedded database with the same tools that you are familiar with in dealing with projects and data in an OpenWorks database instance in an Oracle database; however, the embedded database allows you to have a project that only you have access to, or which may be on a laptop, disconnected from any other computer or network.

In the DecisionSpace software, a new plug-in allows you to create a project database in an embedded database from data selected in the data inventory in the DecisionSpace window.

Note

By default, the OpenWorks installation process automatically creates and configures a new embedded database called EMBEDDED_OW.

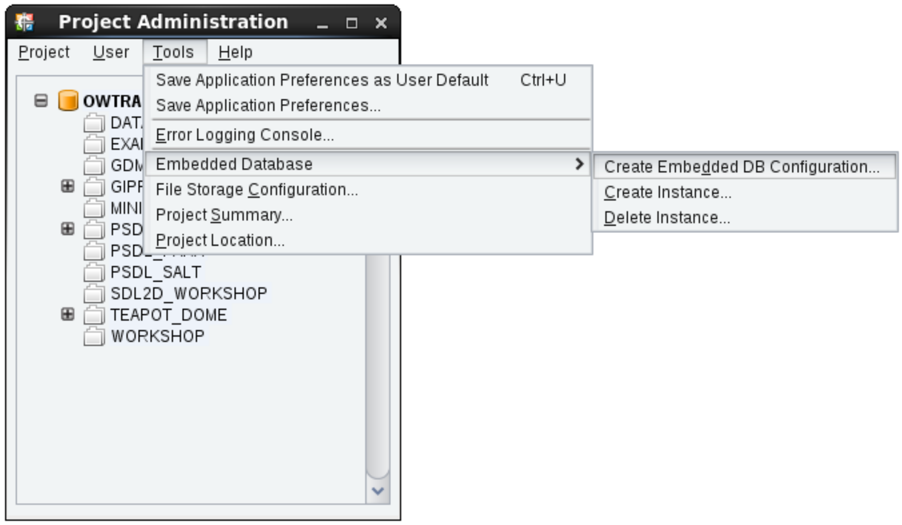
Exercise: Creating a Local Embedded Database with SQLite

1. Make sure you have set up your environment in OpenWorks 5000.10 or higher to connect to oracle.

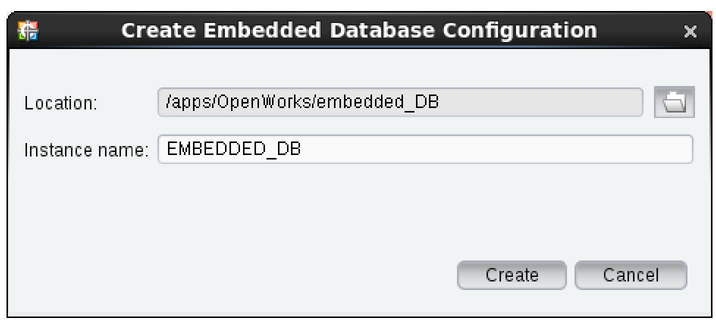
2. Log on as an OpenWorks user with the OW_Administrator role in the OpenWorks instance.

3. Start **Project Administration** from the OpenWorks command menu; select **Project > Project Administration**. The Project Administration window displays.

4. Select **Tools** > **Embedded Database** > **Create Embedded DB Configuration**.

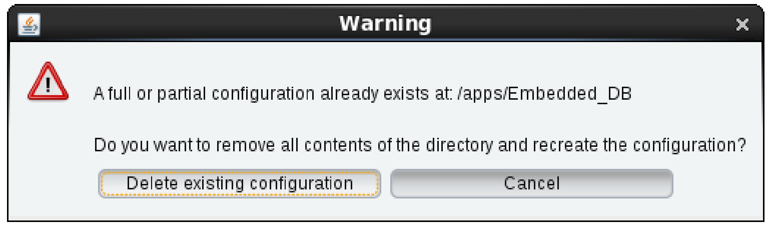


5. Select a **Location** on the local machine. This is the area where local data will be stored. For best results, this should be an empty folder on your local machine with a large amount of free space. Enter a name for the new embedded database SID or **Instance Name** and click the **Create** button.

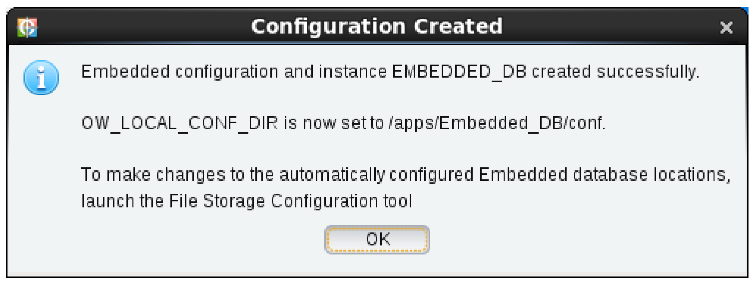


Note

You could receive a warning about a full or partial configuration already existing at the same location. Choose **Delete Existing Configuration** as shown in the image below.



Once the embedded database is created, you will receive the created successfully message. The File Storage Configuration tool can be accessed from **Project Administration > Tools > File Storage Configuration.**



The File Storage Configuration allows you to configure parts of the OpenWorks environment and to determine where seismic files and other types of data are stored for a district. It allows you to create and edit the OpenWorks configuration files: district.dat, owdir.dat, and dir.dat. The dialog box has three tabs:

- **Oracle District** tab: The configuration of a Oracle District
- **Embedded DB District** tab: The configuration of an Embedded Database District is very similar to configuring an Oracle District
- **Embedded DB Locations** tab: Allows you to create new locations for the files of an instance of an embedded database or remove the file location for an instance of an embedded database created.

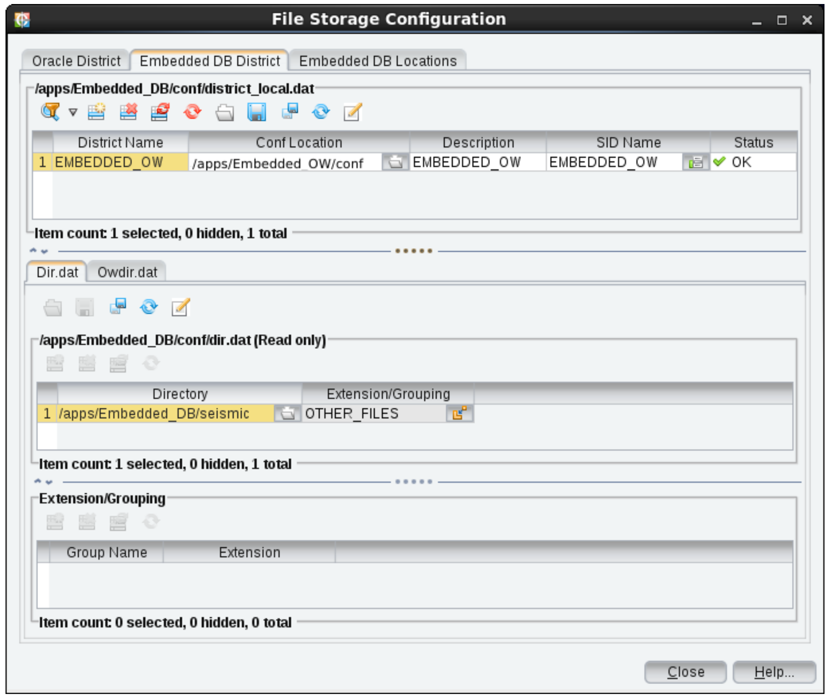
6. From **File Storage Configuration** tool, add an entry for the name of the new district. Set the config location to the location where the system will keep your dir.dat and owdir.dat.

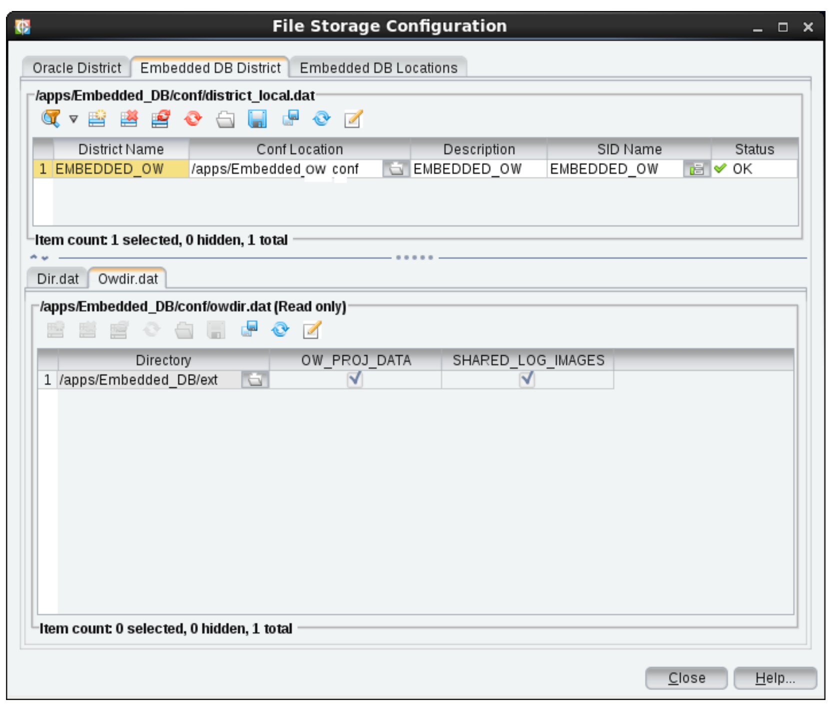
If you want all embedded database SIDs to share the same seismic data, you can make the "Conf Location" the same.

If you selected a new area for the Conf Location, you will need to fill out the information below. Create an entry for the dir.dat and owdir.dat files.

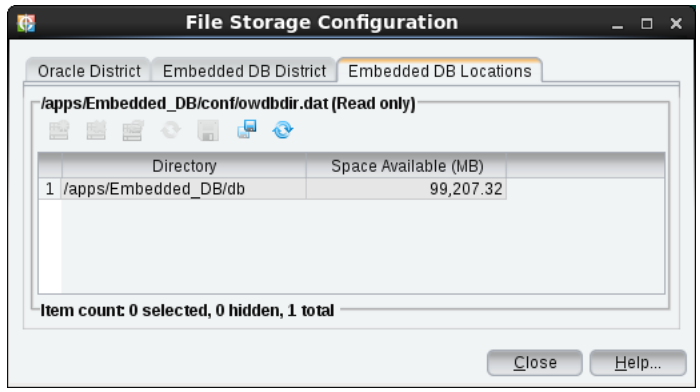
Look for the green check mark and "OK" under the status column to verify that everything is configured properly.

Be sure to **Save**, and **Close** the tool when finished.

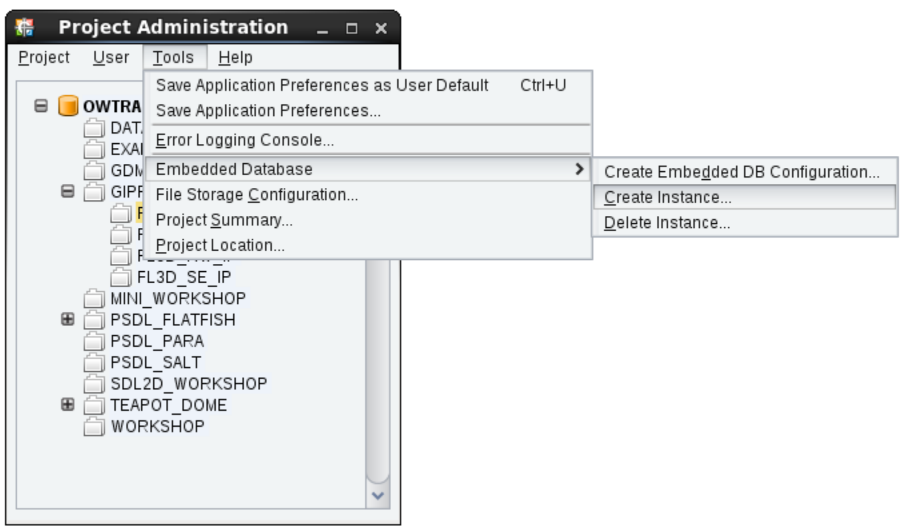




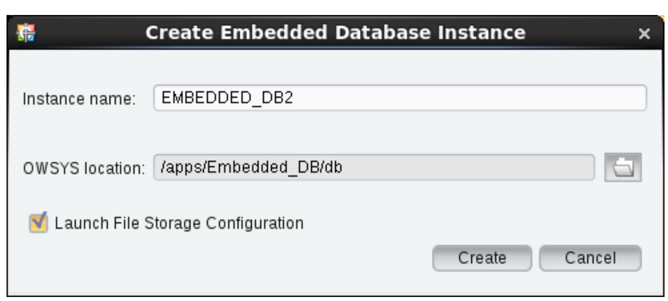
7. Select the **Embedded DB Locations** tab. It shows the instance and location of the embedded database created, and also allows you to create new location for the files of an instance of an embedded database or remove the file location for an instance of an embedded database created.



8. If you want to create additional SIDs or Instance Name, select **Tools > Embedded Database > Create Instance.**



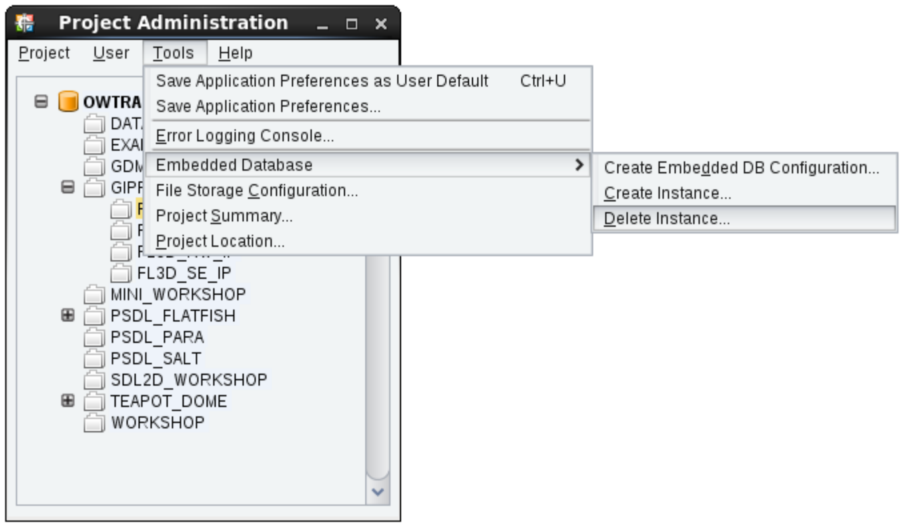
9. Enter **EMBEDDED_DB2** in the **Instance Name** field. Make sure the **Launch File Storage Configuration** check box is selected.



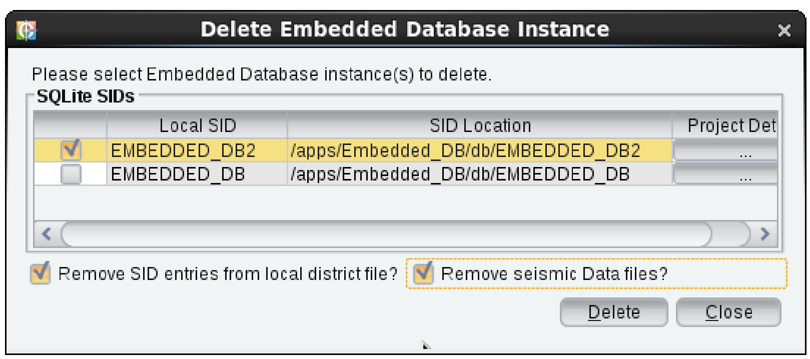
10. Select the folder icon if you wish to change the location where the databases are stored and then click the **Create** button.

Remember, if you want all embedded database SIDs to share the same seismic data, you can make the "Conf Location" the same.

11. If you want delete a SIDs or Instance Name created, select **Tools > Embedded Database > Delete Instance...**.

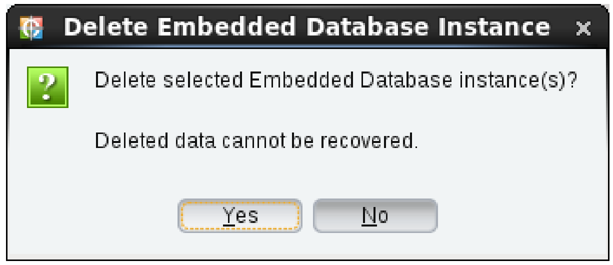


The *Delete Embedded Database Instance* window appears.



12. Select the SID **EMBEDDED_DB2** to delete. Select the **Remove seismic Data files** check box if you want to remove the seismic

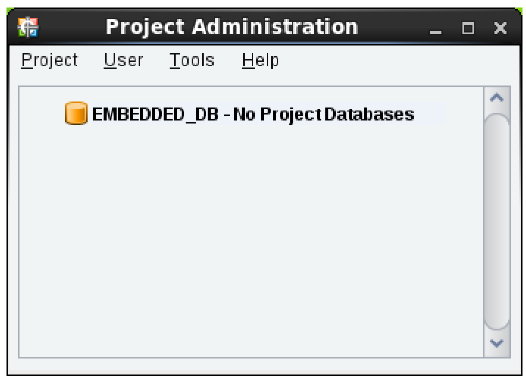
data as well and then click the **Delete** button. Confirm the deletion by clicking the **Yes** button.



Copying an Existing Oracle Project with Seismic Data to an Embedded Database

Once an embedded database has been created. The embedded database SID can be selected in the **Project Status** Tool, selecting the new **District** for the embedded database created, after that, Project Administration will allow you to modify the contents of that SID.

You have the option of copying an existing Oracle Database or Interpretation Project to the disconnected SID or creating a new empty database and using data import tools to construct a new database locally.



In the DecisionSpace software, a new plug-in allows you to create a project database in an embedded database from data selected in the data inventory in the DecisionSpace window.

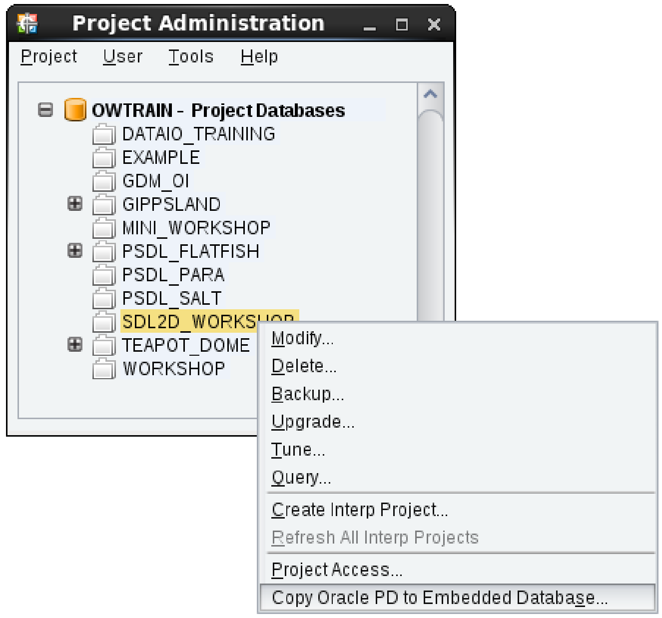
Exercise: Copying an Existing Oracle Project to a Local Database

1. Make sure you have set up your environment in OpenWorks 5000.10 or higher to connect to oracle.

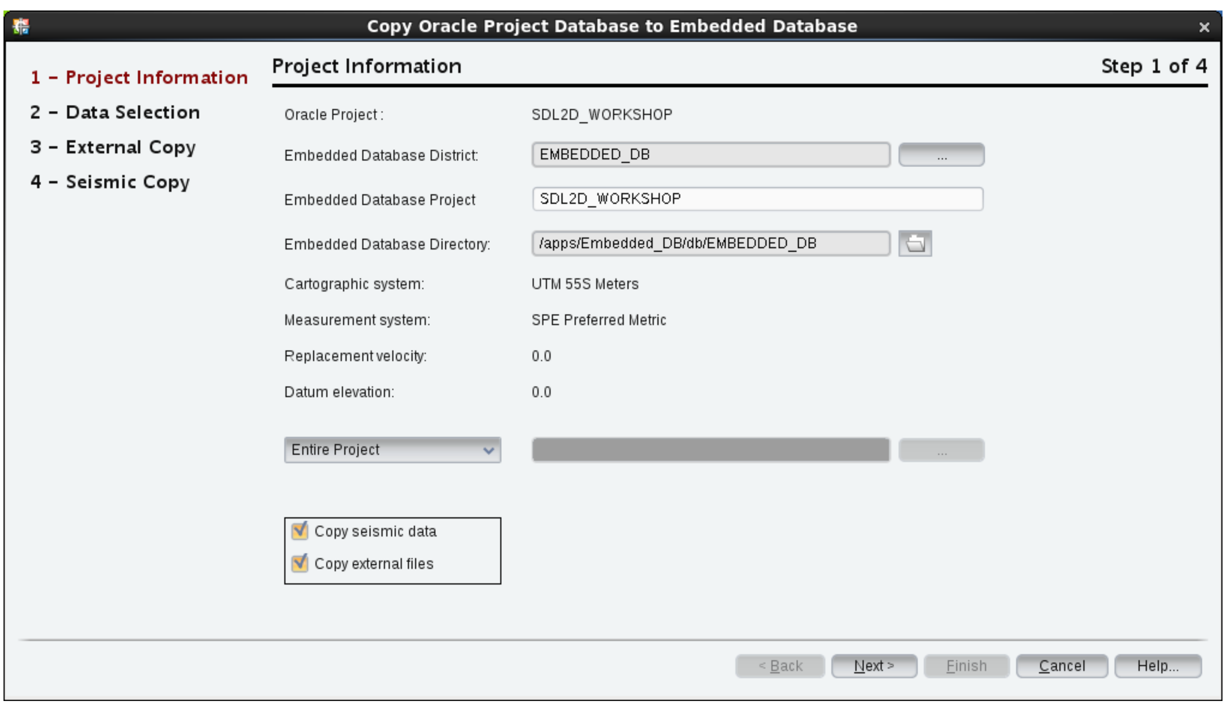
2. Log on as an OpenWorks user with the OW_Administrator role in the OpenWorks instance.

3. Launch **Project Administration** from the OpenWorks command menu, select the project database that you would like copy, right-

click on the project to open the menu and select **Copy Oracle PD to Embedded Database**.



The **Copy Oracle Project Database to Embedded Database - Project Information** window appears.



4. Select the Local District to which the project will be copied, from the **Embedded Database District**. In our scenario, there is only

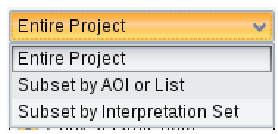
one district and it is automatically selected. However, it is possible to have multiple local Districts and SIDs.

5. Enter a name the database project in the **Embedded Database Project** field. By default, this name is set as the same Oracle database project.

6. Select the database directory location from the **Embedded Database Directory** field. By default, this location is set to the defined area that was used when we created the embedded database.

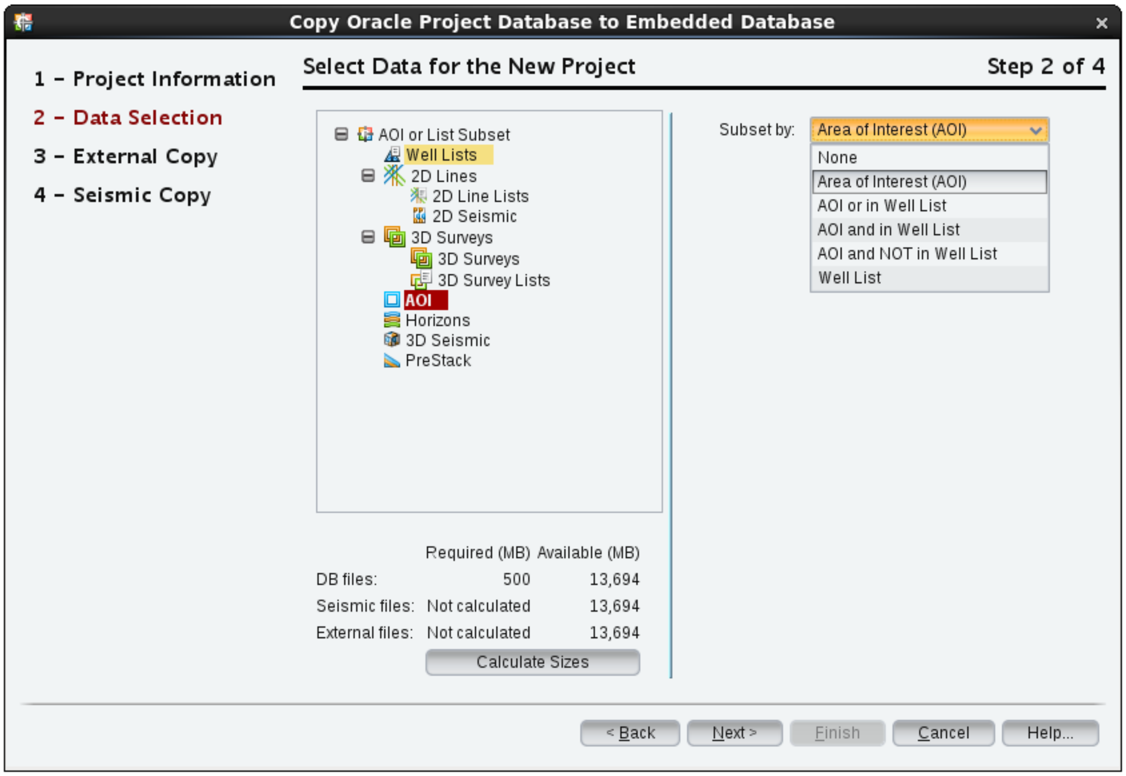
It is also possible to have database files in multiple locations. This allows users to keep projects on different disks or partitions.

It is possible to copy the entire project, or just a subset of the project. If you are copying the entire project, you will skip the next few steps. If you are doing a subset copy, the following steps define the subset.



Optionally, we can copy the **Seismic Data** and **External Files** for the local project as well.

7. The Data Selection screen helps define the area in your subset copy. If you selected **Entire Project** in the previous step, you will skip this screen.

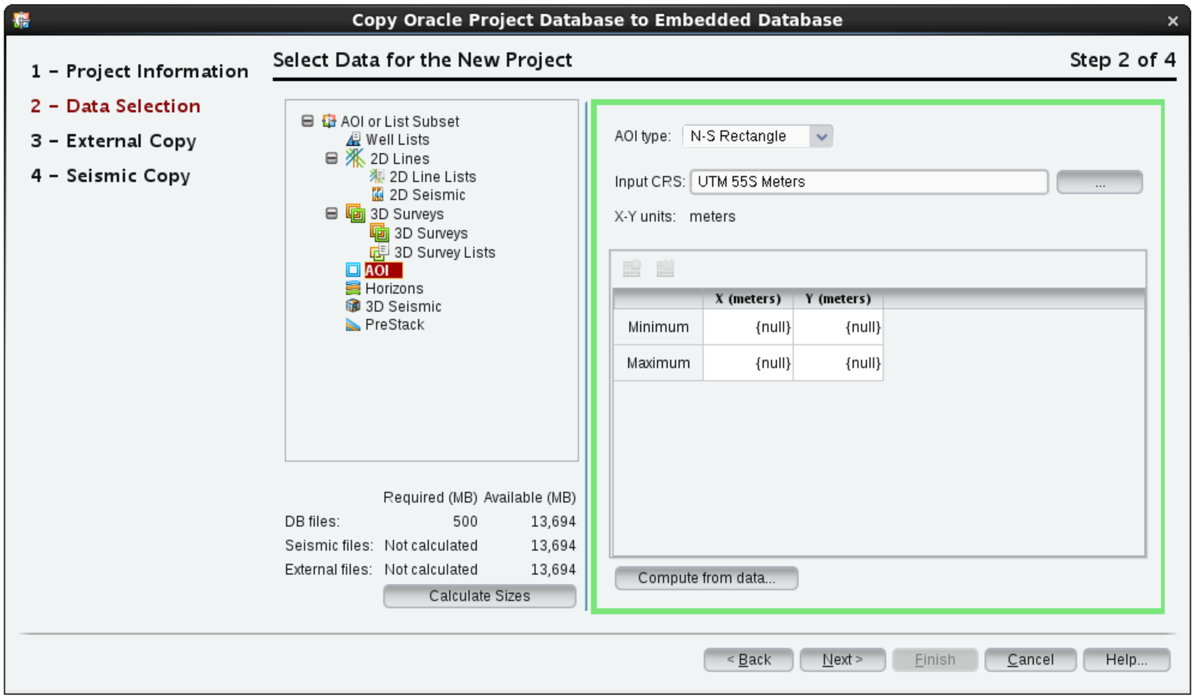


Subset selections are based on the following:

- **Area of Interest (AOI)**: You define the coordinates that encompass the data to be copied.
- **AOI or in Well List**: Data that is in the Well List or in the later defined Area of Interest will be Copied
- **AOI and in Well List**: Data that is in the Well List and in the later defined Area of Interest will be Copied
- **AOI and NOT in Well List**: Data that is in the later defined Area of Interest and not in the selected Well List will be Copied
- **Well List**: You can select the data from a well list.

8. The Area of Interest (AOI) screen defines the new projects area. If you selected **Entire Project** in the first screen, skip this screen and the Area of Interest of your new project will match the area of interest in your existing project.

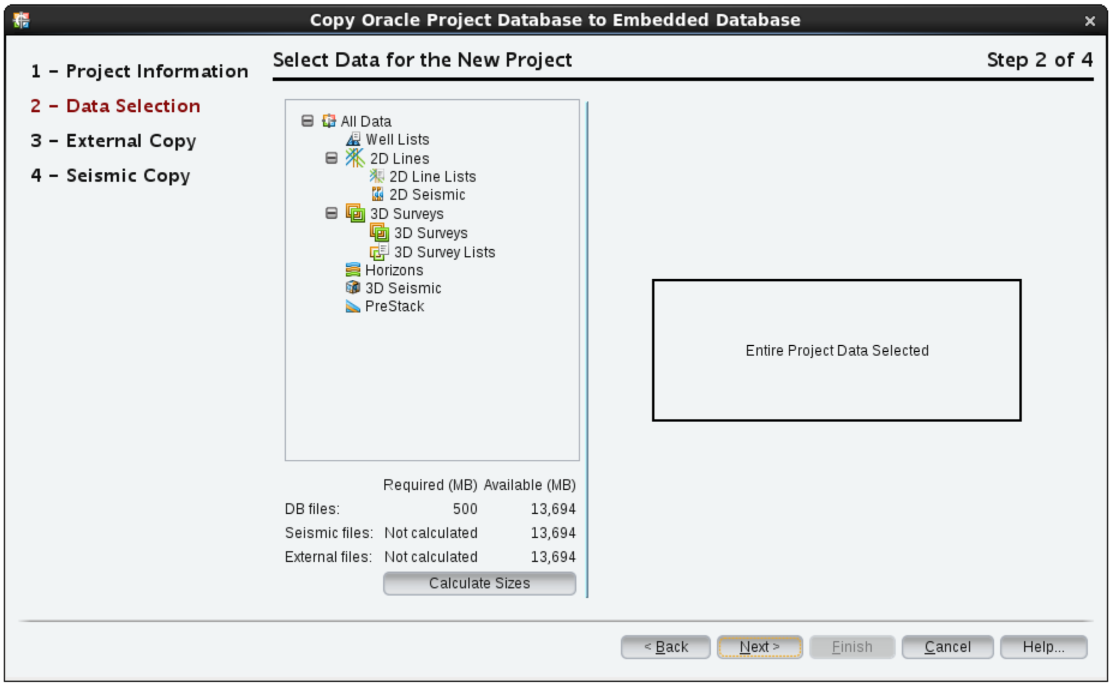
9. If desired, modify the Area of Interest for the new project. You can select **Area of Interest (AOI)** in the previous step, as shown below.



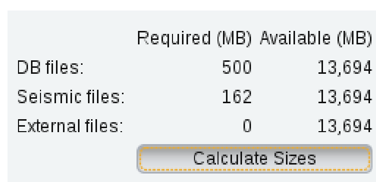
10. Click the **AOI** icon to display it on the screen.

11. If desired, modify the **Area of Interest** for the new project. You can set the new area of interest for the project.

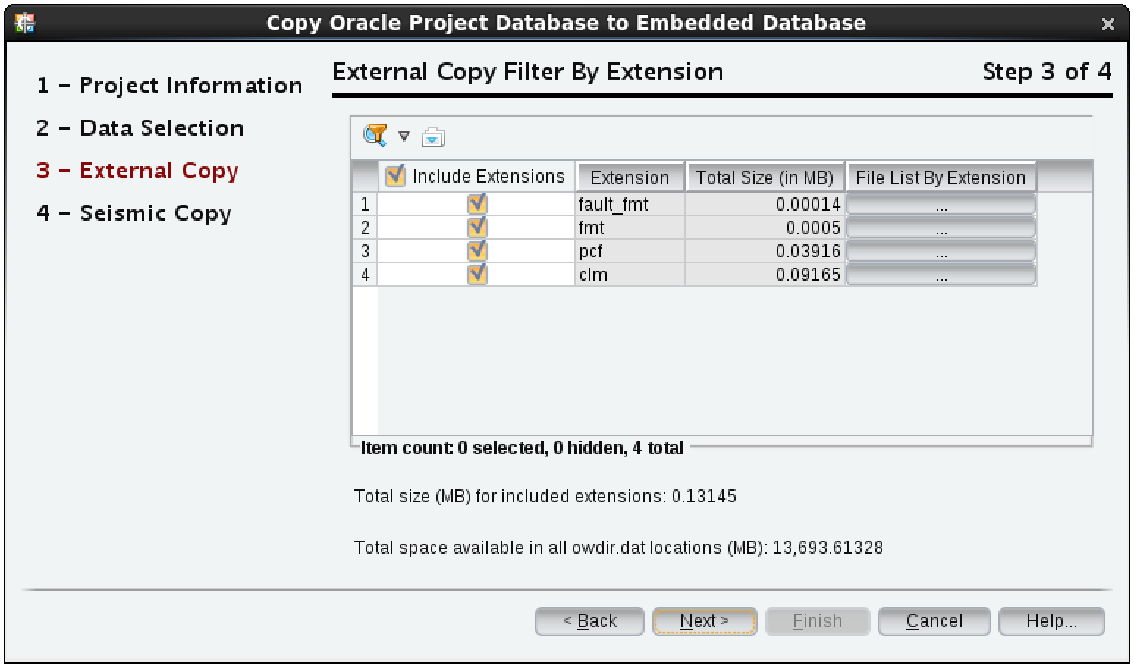
12. If you selected **Entire Project** in the first screen, the following screen appears.



13. Optionally, you can also calculate the total size of the project by clicking the **Calculate Sizes** button.



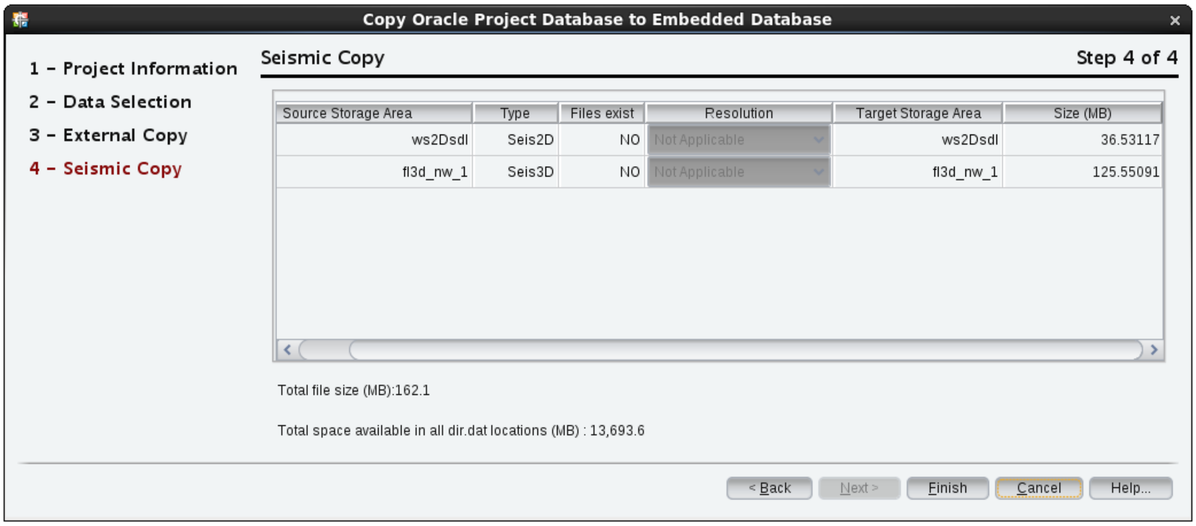
14. Click the **Next** button.



Here, you can filter and select external files for copying to an embedded database. These files include only the external files for the project.

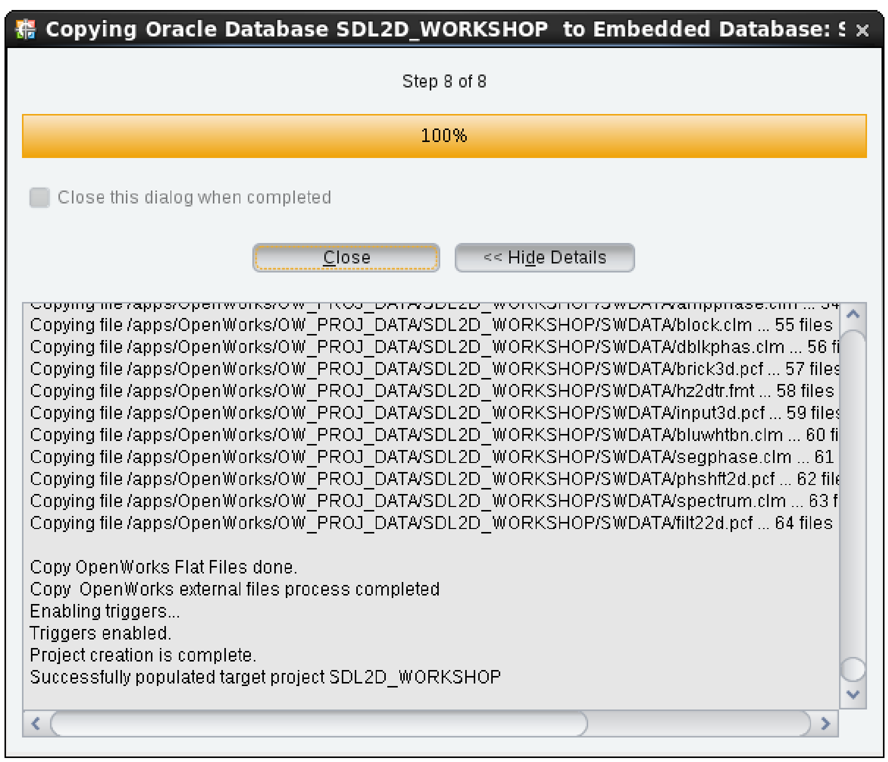
If external files are not stored on the local machine, a user will not be able to access those files when disconnected from the network. Here, we will copy these files to the local machine, so disconnected users can access the data. This panel will show how much data will be copied, and make sure users have the needed space. Users can choose to copy all of the data, or just a subset.

15. Click the **Next** button.



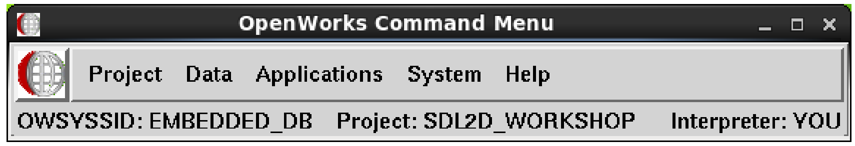
This window enables you to view all the seismic files that are to be copied.

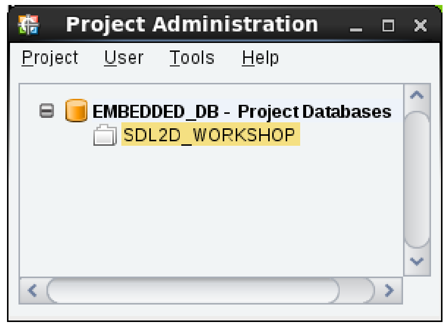
16. Click the **Finish** button to begin transferring the project and copy the external files and seismic data.



17. Once the local project has been created from the Oracle project database. The embedded database SID can be selected in the

Project Status Tool, selecting the new **District** for the embedded database created. Project Administration will then allow you to modify the new project copy locally.





The **Create**, **Backup**, **Restore**, and **Delete** actions on an embedded database are supported. We can use any data loading tool in order to import well or seismic data to the embedded database.

In the DecisionSpace software, a new plug-in allows you to create a project database in an embedded database from data selected in the data inventory in the DecisionSpace window, also we can use any data load tool used in DecisionSpace software to import data to the embedded database created.

Exercise 4: Using PDT to Copy Data from One Project Database to Another

In this exercise you will use PDT to copy data from PSDL_FLATFISH to SDL_2D_WORKSHOP. You may or may not already have loaded data into SDL_2D_WORKSHOP, so the contents of your projects may look slightly different than the ones presented in this exercise.

Starting Project Data Transfer

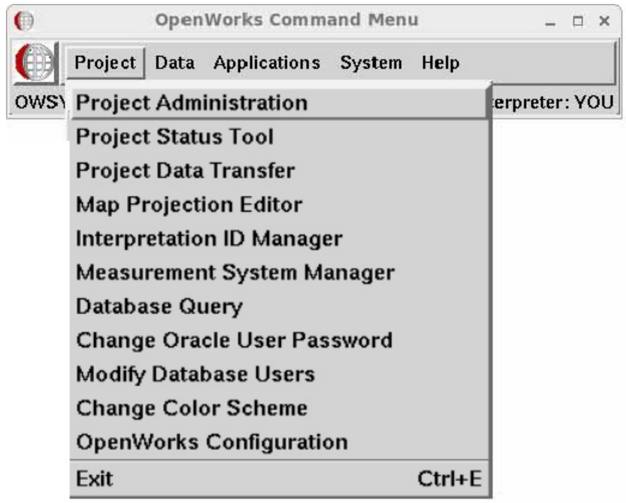
To run this utility, you must log on as a user of the OpenWorks software who:

- is an Internal Oracle user of the Oracle database
- has access permissions as an interpreter able to at least browse the source project
- has interpreter access permissions to the target project of at least *limited interpreter* level

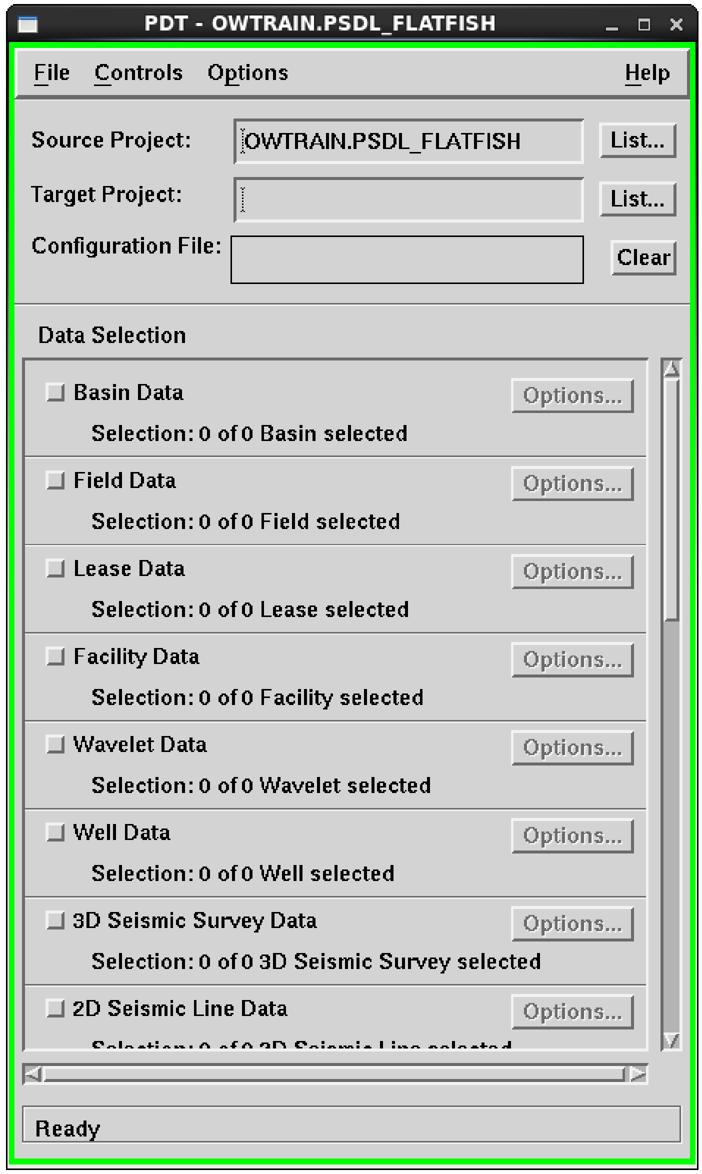
Before starting Project Data Transfer, you can set the OWSYSSID to the appropriate Oracle instance of the source project to prepare for Pointing Dispatcher software.

1. Select *PSDL_FLATFISH* as the OpenWorks project database in Project Status Tool if not already set.

2. From the OpenWorks Command Menu, select **Project > Project Data Transfer.**



The *Project Data Transfer* dialog box displays.

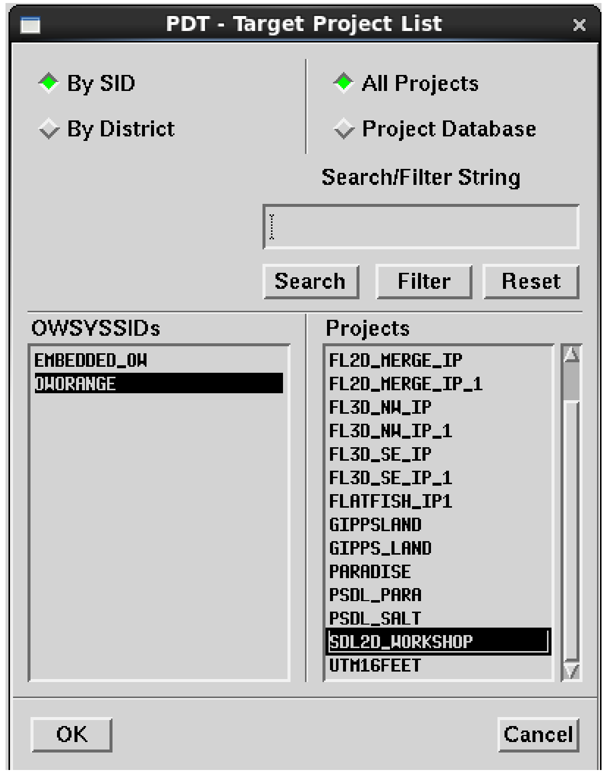


Configuration files are used to run PDT in batch mode. Set all the PDT parameters and select **File > Save As…** (give the file a name with a *.pdt* extension)

Execute in a terminal window using the command:
`pdt -cf<path_to_file>ConfigFileName.pdt`
or open the file in PDT and select **Controls > Transfer…**

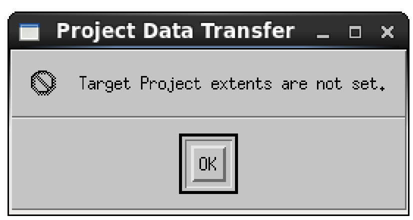
The source project should be already set; Click **List…** to set the Source Project to *PSDL_FLATFISH* if it is not already selected.

3. Click **List…** next to *Target Project*. Select **SDL_2D_WORKSHOP** from the list.



PDT can be used to transfer data to different OWSYSSIDs.

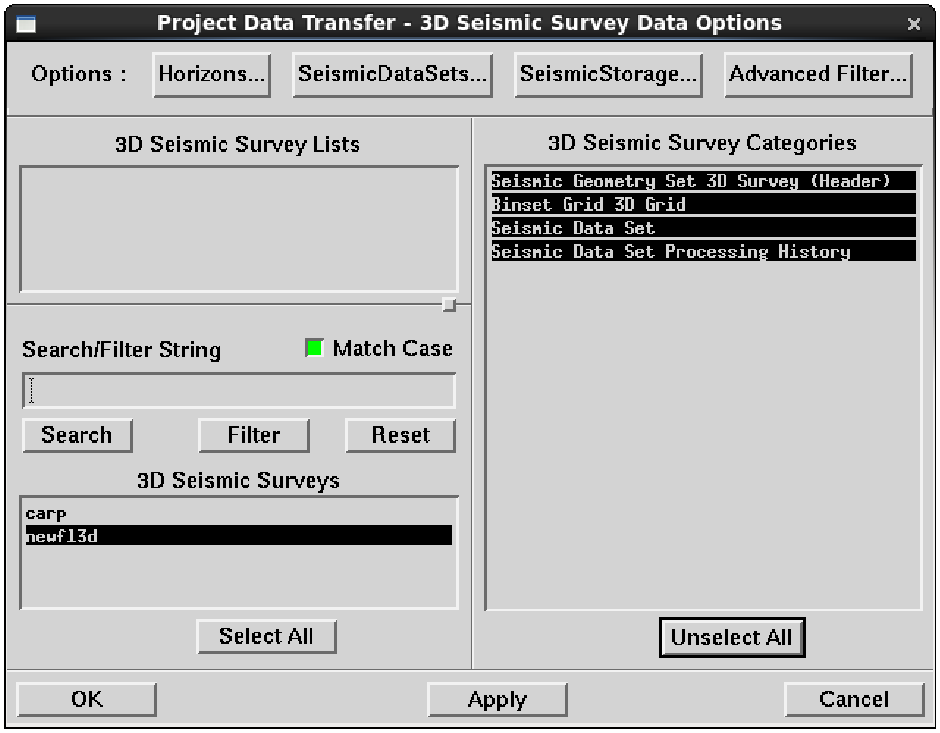
PDT checks the areal extents of both projects and posts a message in a dialog box telling you if the target project's extents are not set, you will receive the following message.



4. Click **OK** to continue.

In the Data Selection options, toggle **ON** all the data you want to transfer. Each selection choice can be customized using the corresponding **Options…**dialog.

5. Toggle **ON** *3D Seismic Survey Data* and click **Options…**to select the 3D seismic data you want to transfer.



6. Select the *newfl3d* survey and all the categories using **Select All** (Select All toggles to Unselect All).

The survey grid, seismic data, horizon data and processing history will be transferred if you select all the categories.

OpenWorks software provides you with options to filter horizons and seismic data by name.

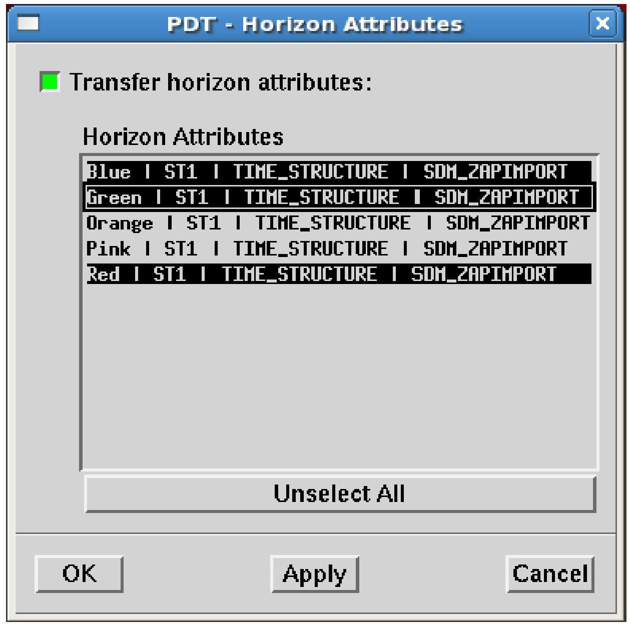
In the Options at the top of this dialog, click the data type button and highlight the data you want to transfer. Each selection choice can be customized using the corresponding Options dialog.

Workflow to filter these types of data:

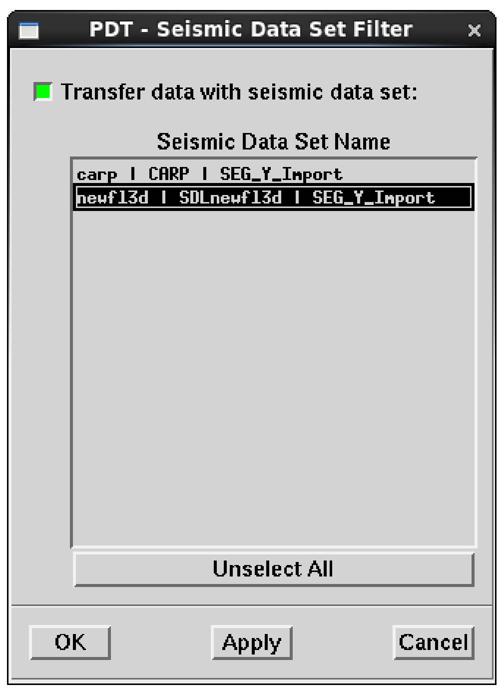
- Select the seismic surveys you want to transfer.
- Select the categories of 3D seismic survey data you want to transfer.
- Specify filters for horizon names, seismic data sets, advanced filter options

- Apply the filter(s).

For horizons:

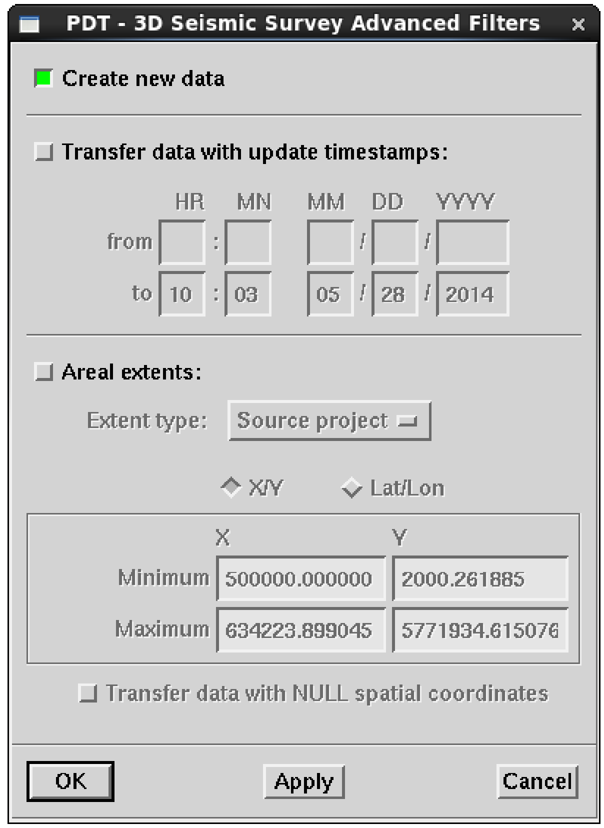


For seismic data sets:



Default the horizon and seismic data set filter options for this exercise.

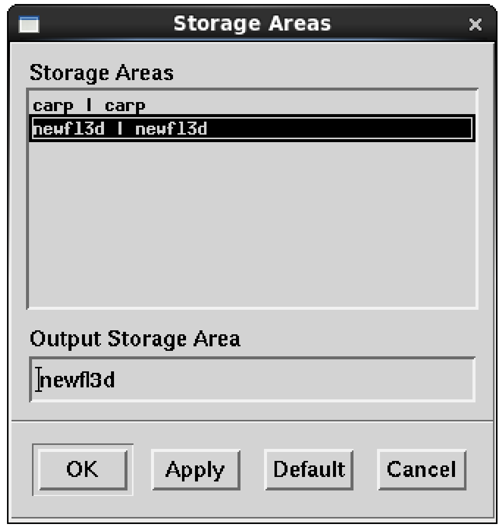
For larger databases, the *Advanced Filter…* options may be useful, allowing you to specify a time stamp range and areal extents to filter the data. Let the advanced filtering options default for this exercise.



PDT can transfer 3D seismic survey data and header information that has been loaded into the database.

- When you transfer 3D seismic data, the flat files associated with the data are also transferred to the Storage Area directory defined in the *dir.dat* file of the target project.
- The storage area for each 3D survey defaults to the storage directory defined in the source project.
- To change a specific target Storage Area, select the Survey/ Storage pair and edit the type in a new storage area.
- Click **Apply** if you want to continue editing.
- Click **OK** to apply the edit and close the dialog.

- Click **Default** to reset the value in the Storage Area lit to the source value.

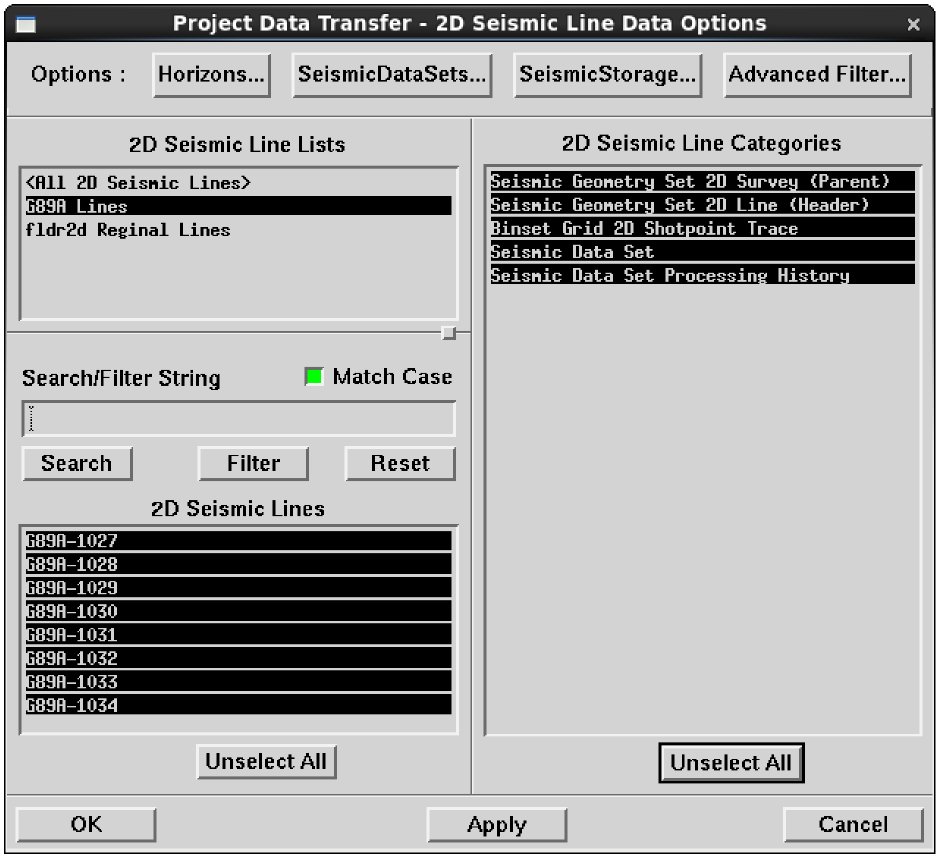


Click the **Cancel** option to close the filter dialog boxes for this exercise if you have opened up the options to view.

7. Click **OK** in the *3D Seismic Survey Data Options* dialog box.

8. Toggle **ON** *2D Seismic Line Data* and click **Options…** to select the 2D seismic data you want to transfer.

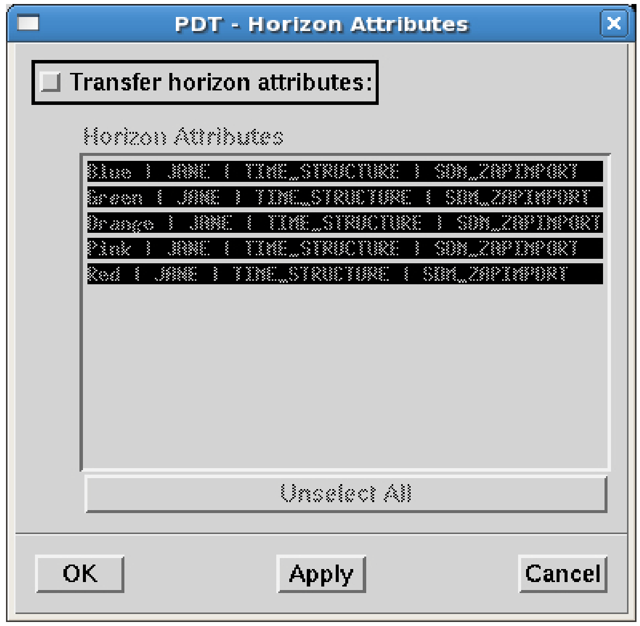
9. Select the eight *G89A* lines (you can use the seismic line list previously created or just select the ones you want to transfer manually) and select all the categories using **Select All**.



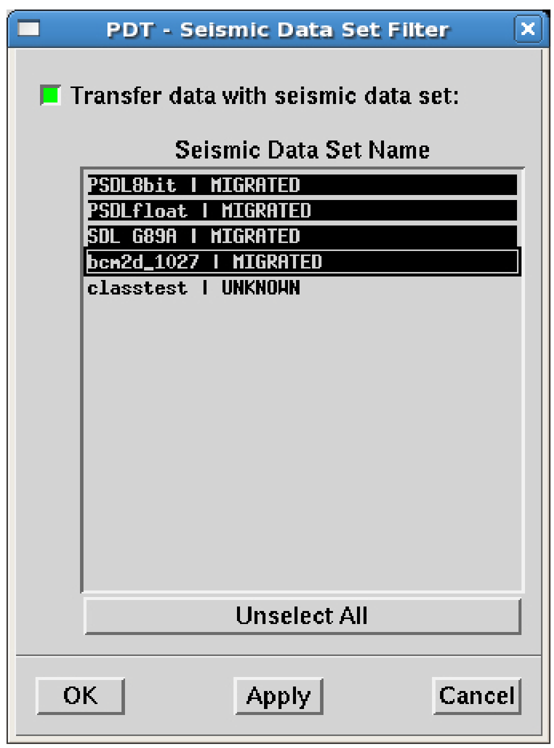
The survey grid, seismic data, horizon data and processing history will be transferred if you select all the categories.

Similar filter *Options* as those for the 3D seismic data are available for 2D lines. The filter dialogs are shown below but you will default the filter options for this exercise.

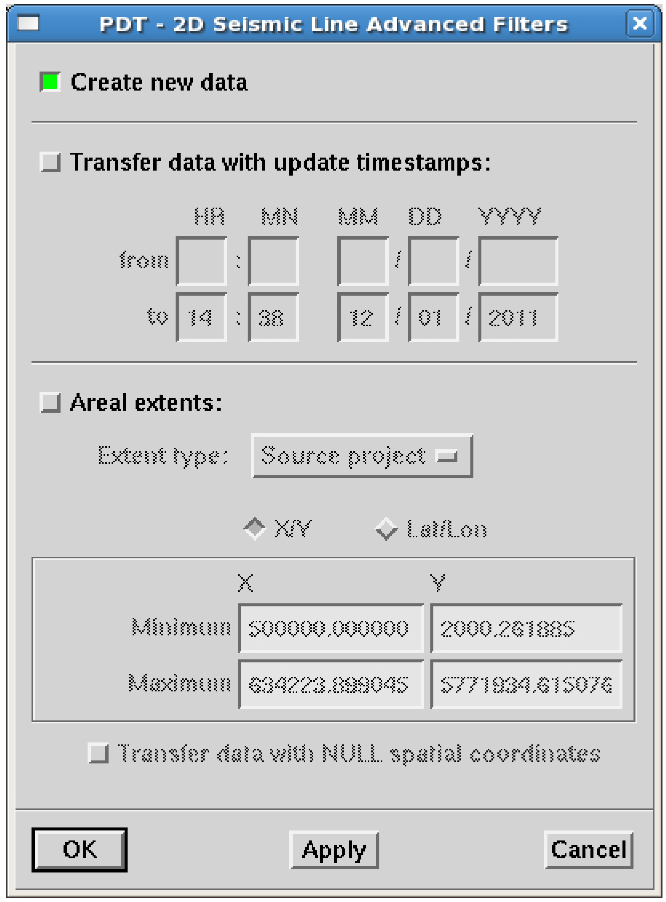
For horizons:



For seismic data sets:



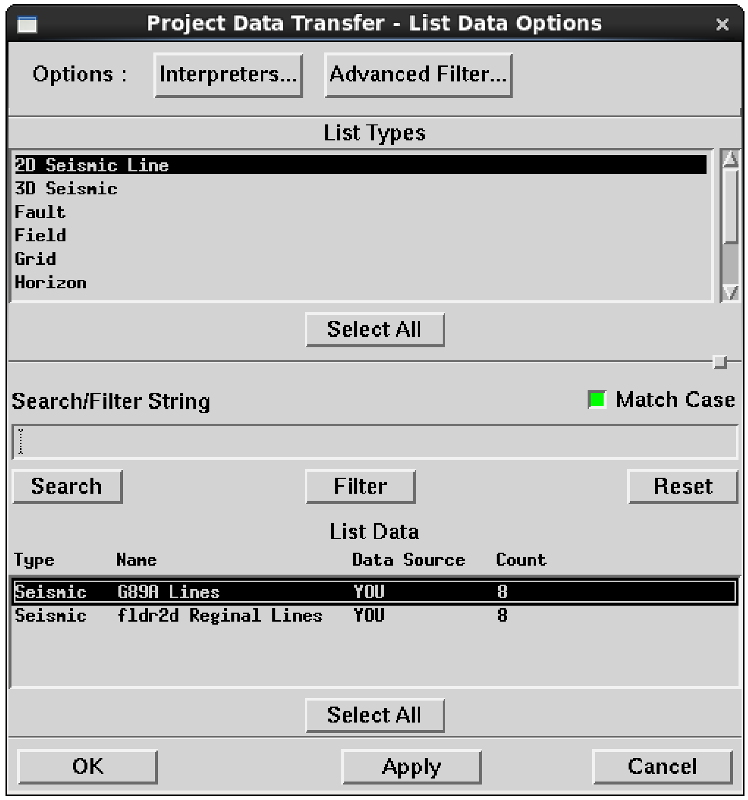
For larger databases, the *Advanced Filter…* options may be useful, allowing you to specify a time stamp range and areal extents to filter the data. Let the advanced filtering options default for this exercise.



10. Click **OK** in the *2D Seismic Line Data Options* dialog box.

11. Toggle **ON** *List Data* and click **Options…**to select any lists stored in the database that you want to transfer.

12. Select the eight *G89A lines* list you created in an earlier exercise.

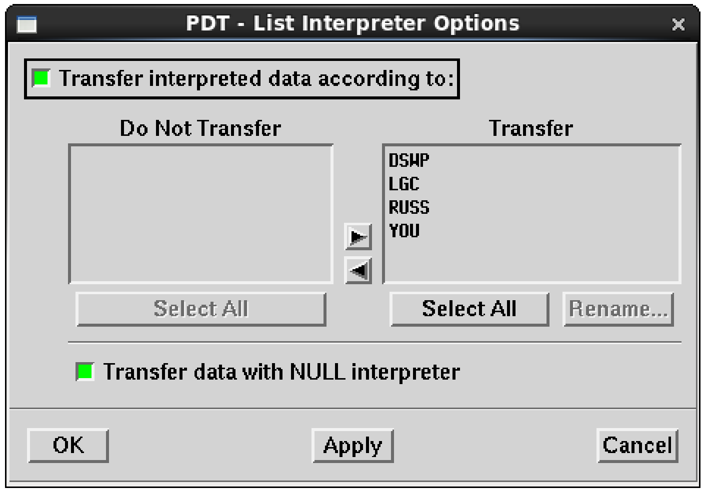


The List Data selection includes the following types of lists:

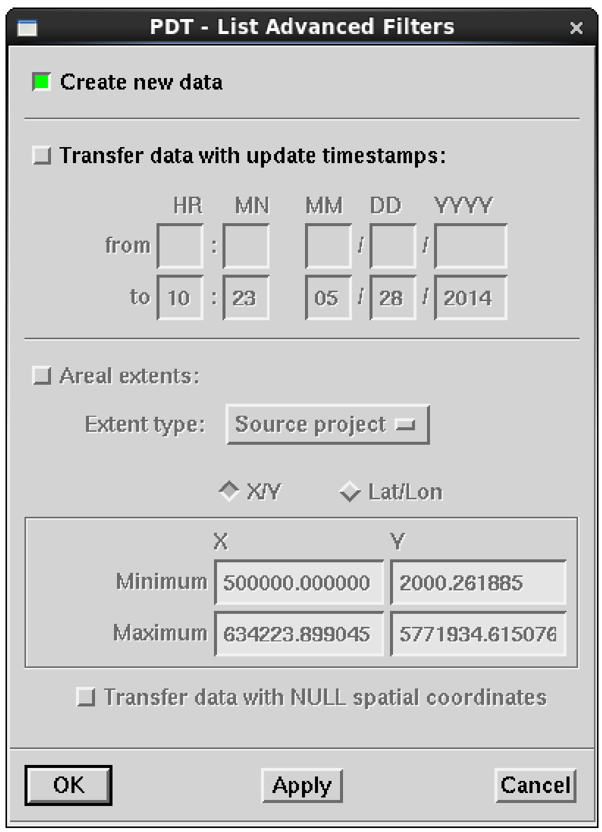
- 2D Seismic Lines
- 3D Seismic (datasets)
- Fault
- Field
- Grid
- Horizon
- Lease
- Log Curve
- Well

Options for filtering list data selecting include interpreter choice and advanced filtering.

Interpreter Selection dialog box:



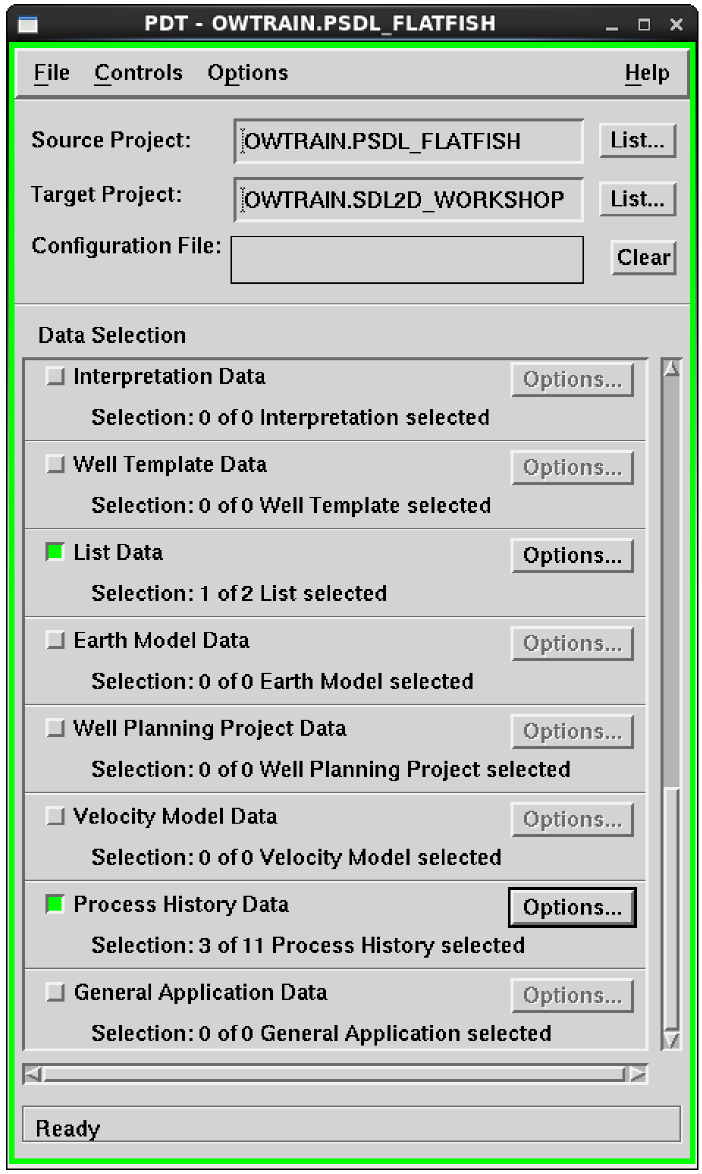
Advanced Filter dialog box:



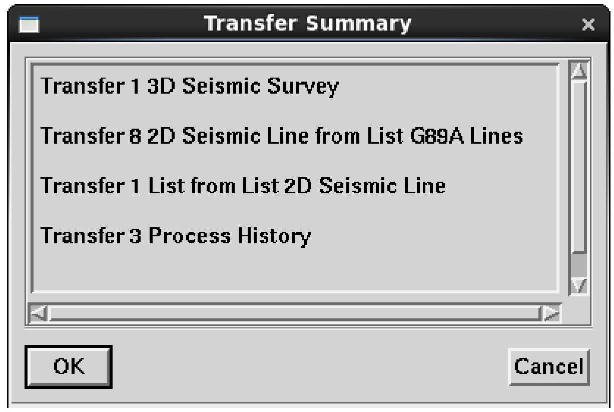
13. Click **OK**.

14. Toggle ON *Process History Data* and click **Options**. Toggle ON *Manual Select* and select the first three processes from the list.

15. In the main *PDT* dialog box, select **Controls > Transfer…**.

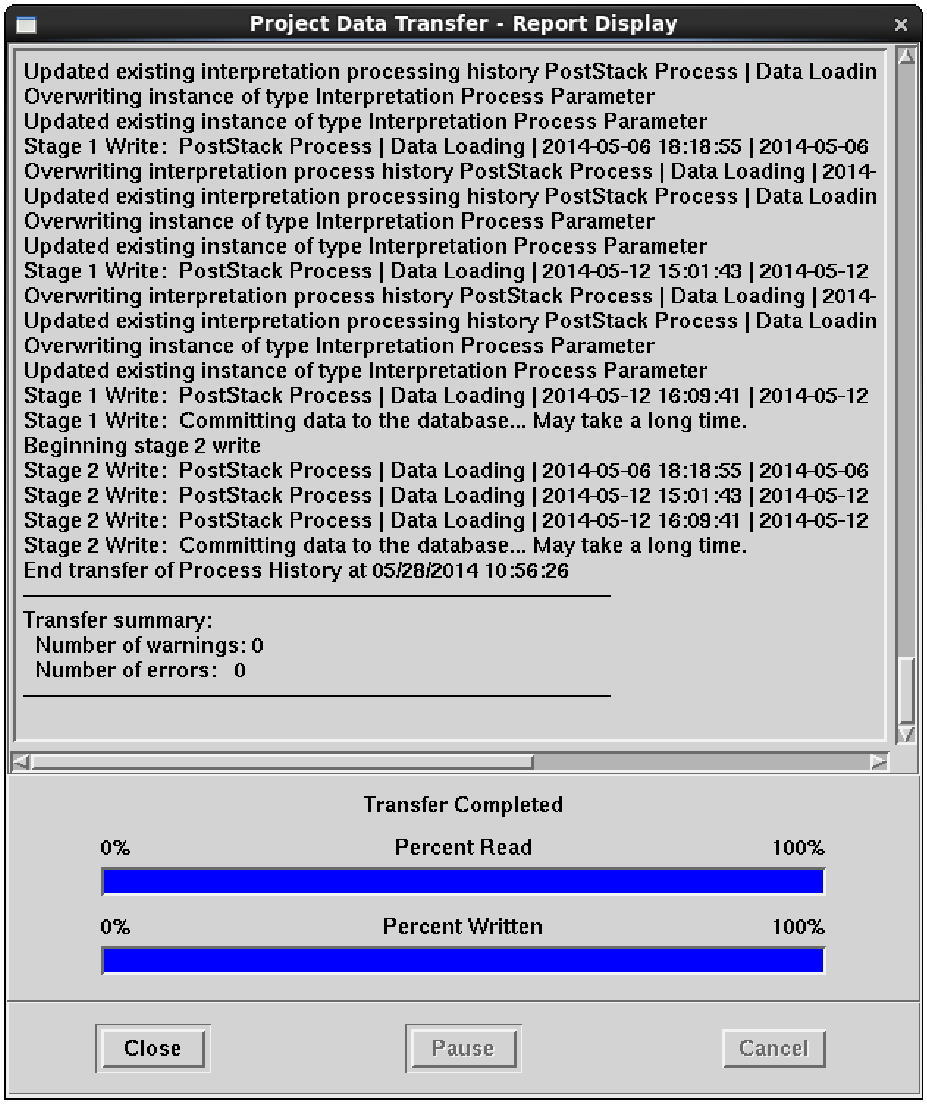


A message displays listing the data that will be transferred.



16. Click **OK** in the *Transfer Summary* message.

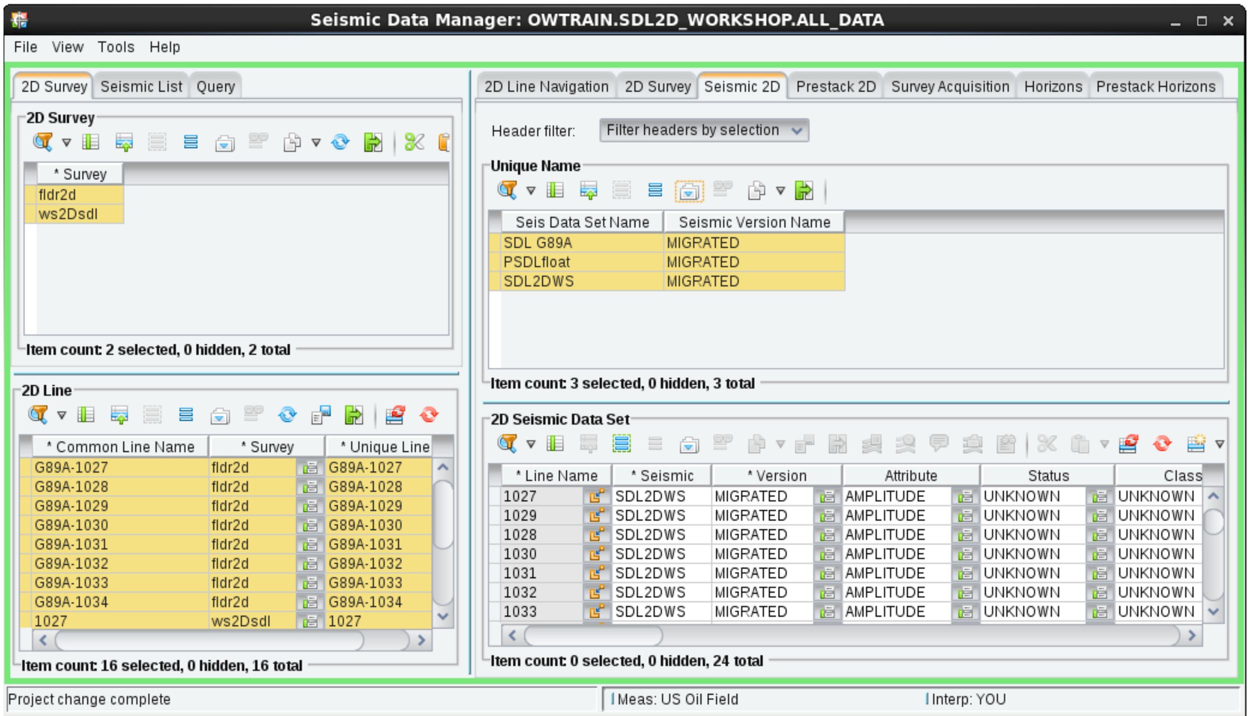
A report displays with information about the transfer, including a warning and error summary. Review this report for any problems.



17. Click **Close** in the *Project Data Transfer - Report Display.*

18. To exit Project Data Transfer, select **File > Exit** from the menu bar.

It is a good idea to check the data transfer whenever you import or copy data. Seismic data may be checked in Seismic Data Manager, DecisionSpace Geosciences (or another application where you can view seismic data), or WOW.



OpenWorks Back Up & Restore

OpenWorks Backup and Restore utilities are accessed through the *Project Administration* dialog box, which is launched from the OpenWorks command menu by selecting **Project > Project Administration**.

The backup and restore options allow you to back up and restore one or more of the following:

- Oracle database tables
- external OpenWorks files
- external seismic files

Because the database table and the external files are different data formats, and because the locations of the types of external files differ, separate backup files are created for each type of data.

The external files are written to (and restored from) zip files.

You can restore the backup files on any directory or storage device on the network as defined by the configuration files for the OpenWorks database instance.

Before Backing up a Project Database

- Make sure that adequate space is available in the backup directory or on the backup device to store all the backup files

- Make sure no other users are accessing the project when you begin the backup process

- You need Manage access to backup a project database and must also have the OW_ADMINISTRATOR role

Files External to the Project Database

- TDQ velocity models, culture data, StratWorks data, and other data

  The directories that contain these files are specified in the *owdir.dat*, and are backed up with in OpenWorks external files.

- Some seismic data files and other files from the SeisWorks software and other software

  The directories or file systems containing these files are specified in the *dir.dat* and are backed up in the Seismic external files.

- Symbols created by Lithologic Symbol Editor and Well Symbol Editor

  Backing up Custom Symbols: Custom designed symbols are *not backed up with the backup function* in OpenWorks software. When you create symbols in Lithologic Symbol Editor or Well Symbol Editor, they are saved in the following directory:

  ```
  $OW_SYSDATA_DIR/OW_SYS_DATA/owsymbols/
  ```

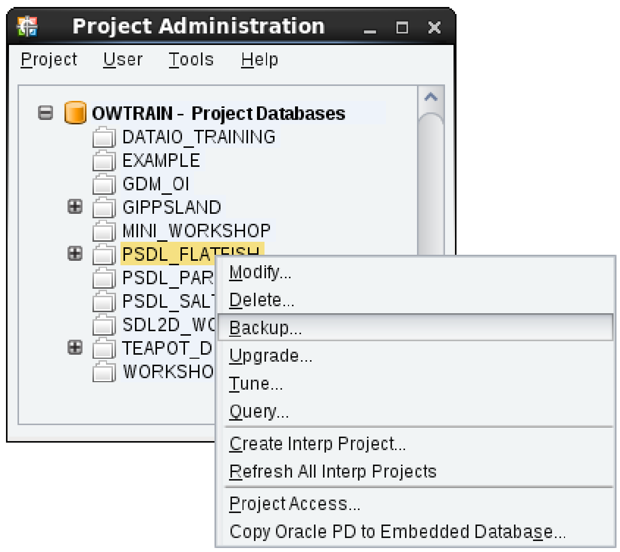
  If you back up a project that accesses a custom symbol, in order to use that symbol in another OpenWorks database instance you must copy the symbol separately from the project and put the file into the appropriate OW_SYS_DATA/owsymbols directory (using UNIX commands) used by the other instance.

Exercise 5: Backing up a Project Database using OpenWorks Backup

The following exercise illustrates the workflow for using the OpenWorks Backup utility to back up the PSDL_FLATFISH project database.

1. From the OpenWorks command menu, select **Project > Project Admin**

2. Highlight the PSDL_FLATFISH project database and select **Project > Project Database > Backup…**

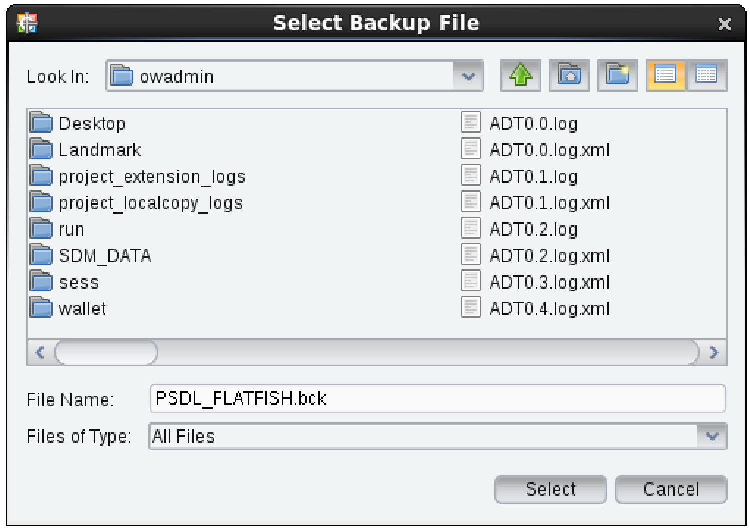


The backup process is essentially a one-to-three step process, depending on the file type selected for backup. First, you need to select the file types you want to backup.

3. Select *All project data* to back up the oracle database, OpenWorks external files and the seismic external files.

4. Click the **Browse…** button for *Oracle project*.

5. In the Select backup file, type `PSDL_FLATFISH.bck`.



The default location for the backup file is the user's home directory, but you can select a different directory path if you wish to place the backup in another location. Use the extension of your choice, but generally the following extensions, *.bck*, *.bak*, or *.bk*, are recognized as backup extensions.

6. Click **Select**.

   The file name shows up in the *Backup* dialog box. Continue to assign names to the rest of the external and seismic backup files.

7. Click the **Browse…** button for *OpenWorks external files*.

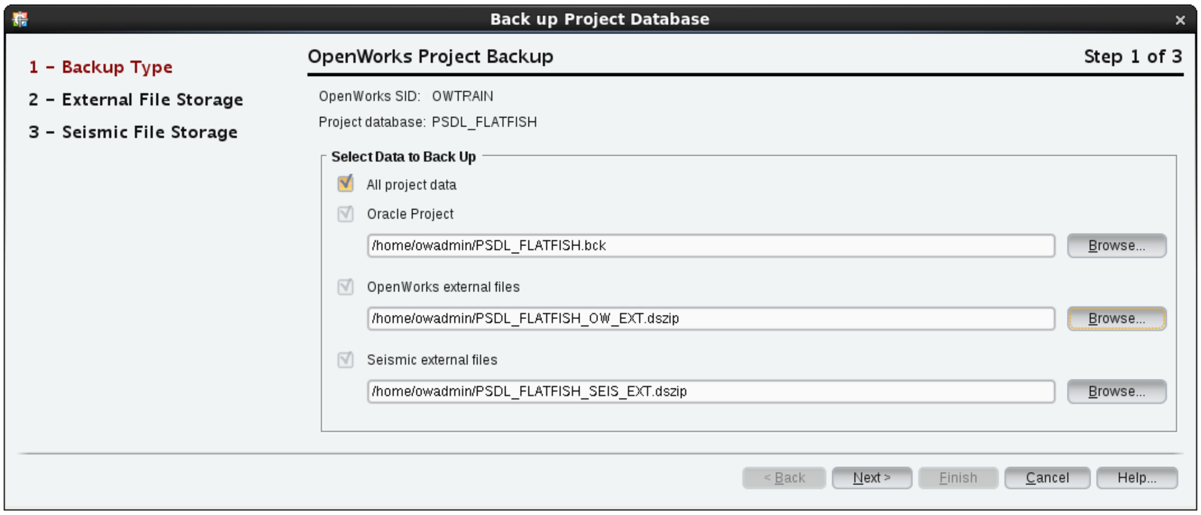
8. In the Select backup file, type **PSDL_FLATFISH_OW_EXT**. Do not add extension of the file at the end, it will be added automatically.

9. Click **Select**.

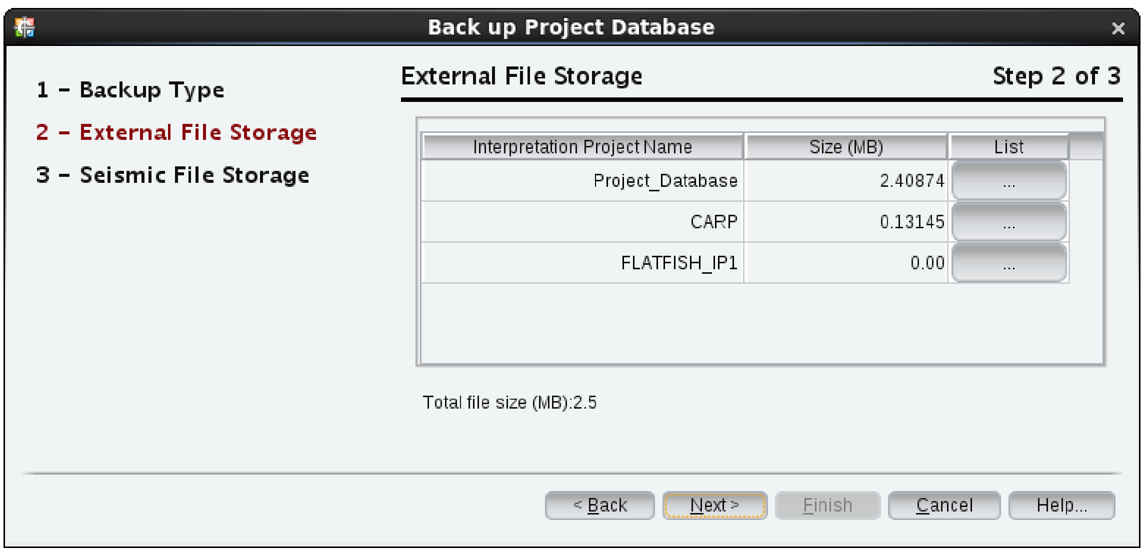
10. Click the **Browse…** button for *Seismic external files*.

11. In the Select backup file, type `PSDL_FLATFISH_SEIS_EXT`. Do not add extension of the file at the end, it will be added automatically

12. Click **Select**.

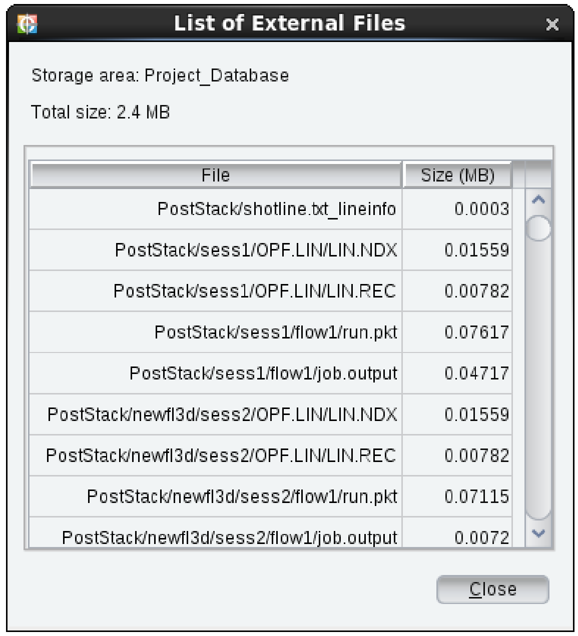


13. Click **Next** in the *Backup* wizard.



Step 2 in the wizard lists the external files to be backed-up and lets you know the size of the files in the directories.

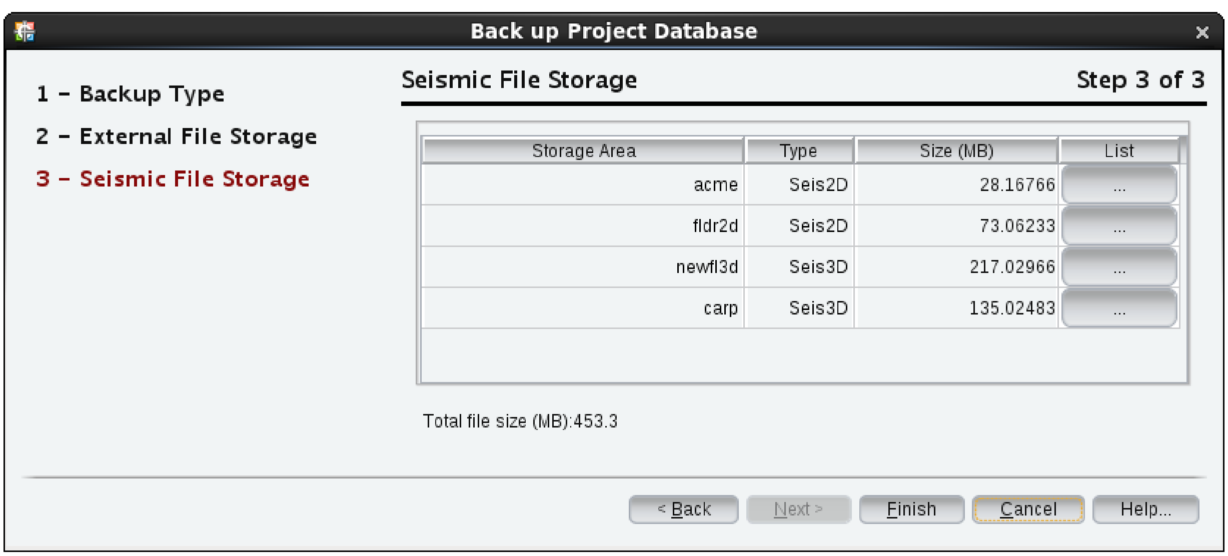
14. Click the **List…**button (...) for either the Project database or interpretation project to see the files.



Note that when backing up a database, the backup process will backup all interpretation projects subsetted from the project database.

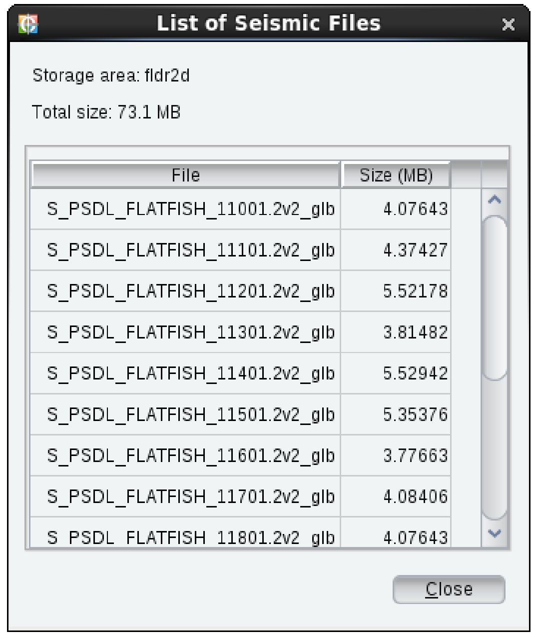
15. Click **OK** to close the list.

16. Click **Next**.



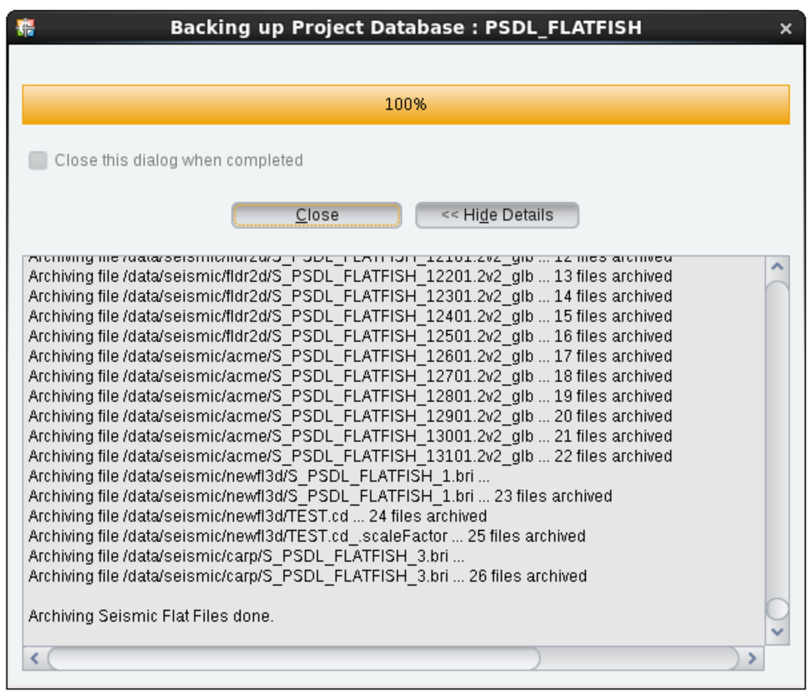
Step 3 in the wizard lists the seismic files and their sizes.

17. To view the files, click the **List…** button (...); click **OK** to close the list.



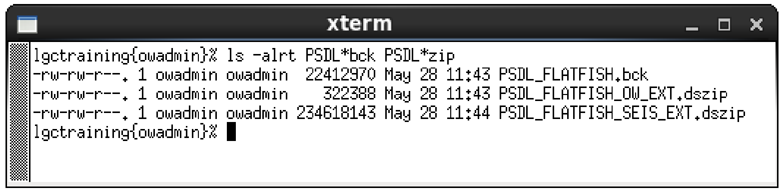
18. Click **Finish** to start the backup process.

A report message detailing the backup process displays.



19. View the details in the Backing up Project Database report and click **Close** to exit back up.

These files are located in the specified directory and can be viewed in a terminal window.



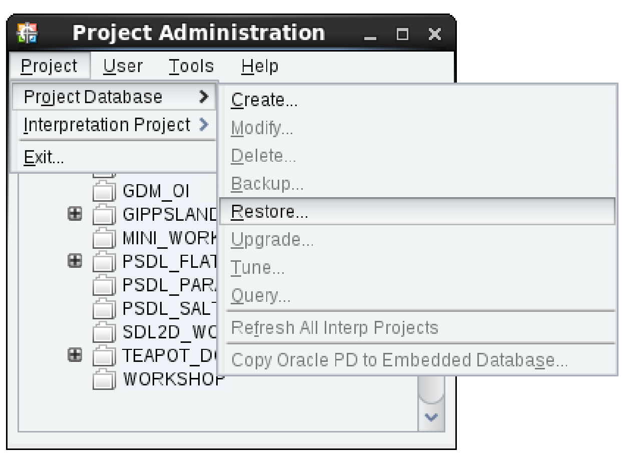
Exercise 6: Restoring up a Project Database using OpenWorks Backup

Before Restoring a Project Database

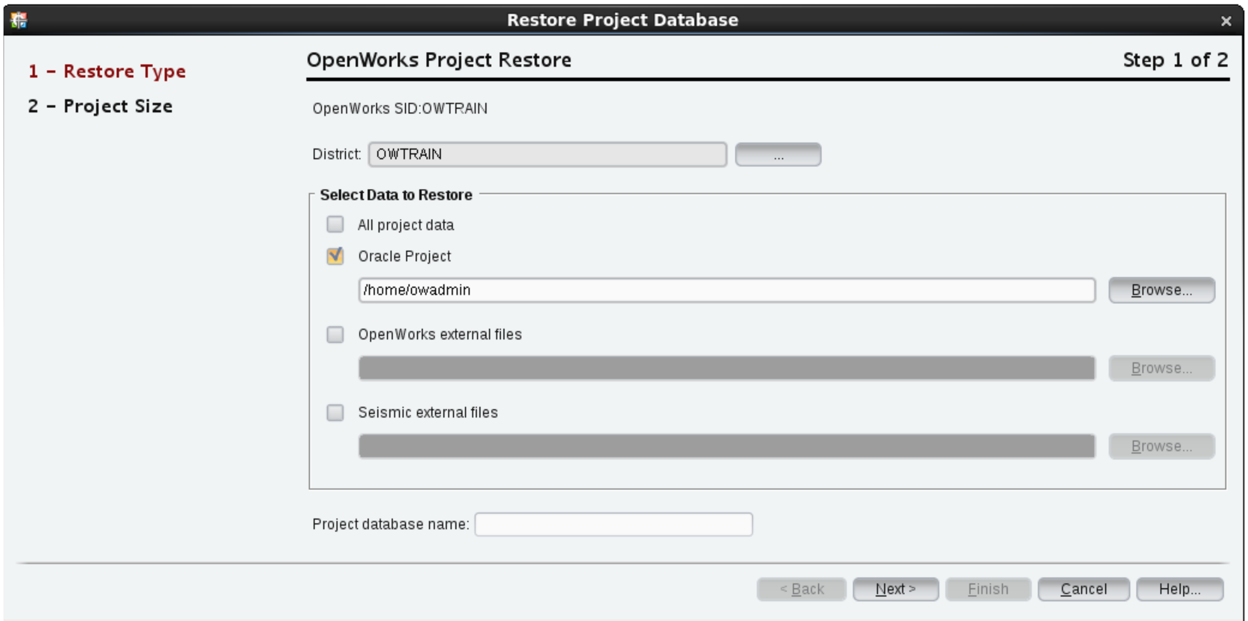
- Make sure that adequate system resources are available to allow the files to restore
- Log on as an OpenWorks user with the OW_ADMINISTRATOR role in the instance where you want the restored project
- Select the OpenWorks instance (in Project Status) where you want the new project
- If you want to make any changes to the table users with Limited Interpret can access in the restored project, the list of tables in OW_ADMIN_UTILS.L_INTERP_MASTER table must be changed before you backup and restore the project (see the online help path **Project Management > Project Administration > Managing Project Databases > Changing Limited Interpret Access**)

The following exercise illustrates the workflow for restoring an OpenWorks backup.

1. From the OpenWorks command menu, select **Project > Project Admin**
2. Select **Project > Project Database > Restore…**



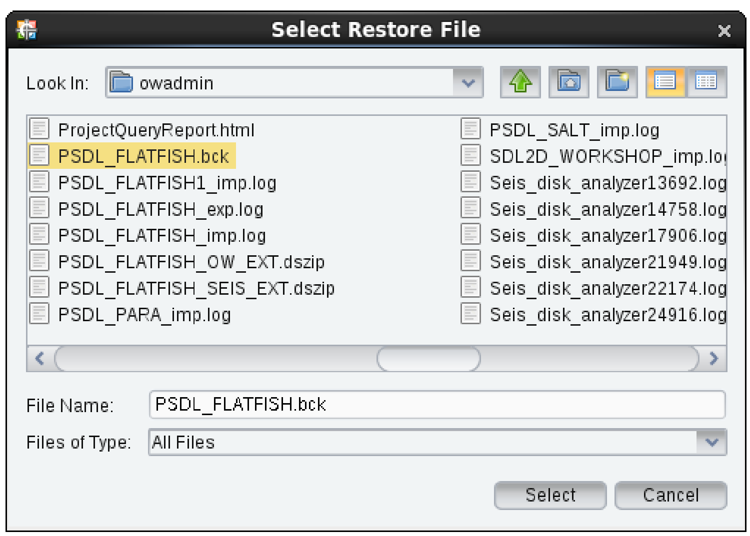
The *Restore* wizard displays.



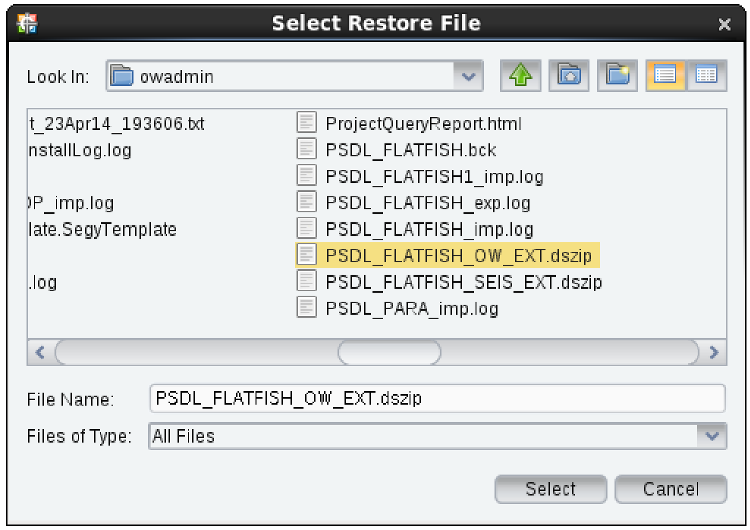
You can select the types of files you want to restore.

3. To restore the files just backed up, toggle **ON** *All project data* and select the appropriate files.

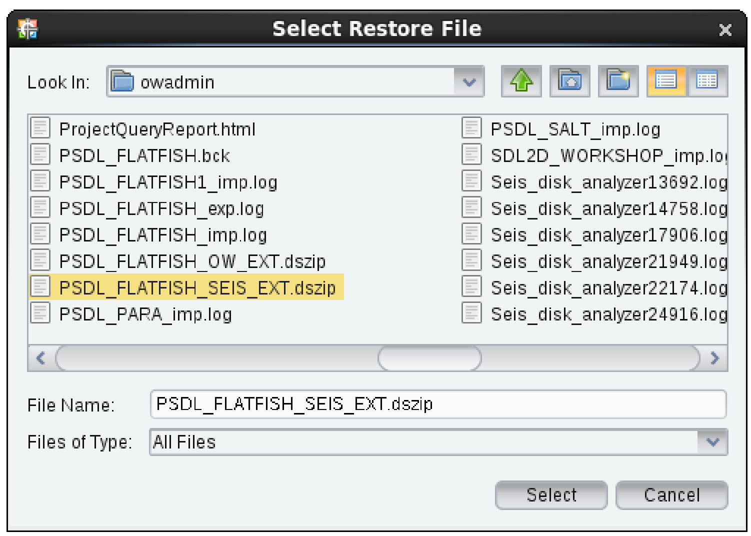
4. Click **Browse…** for the Oracle project selection. Highlight the file you created in the previous exercise, and click **Select**.



5. Click **Browse…** for the OpenWorks external file selection. Highlight the file you created in the previous exercise, and click **Select**.



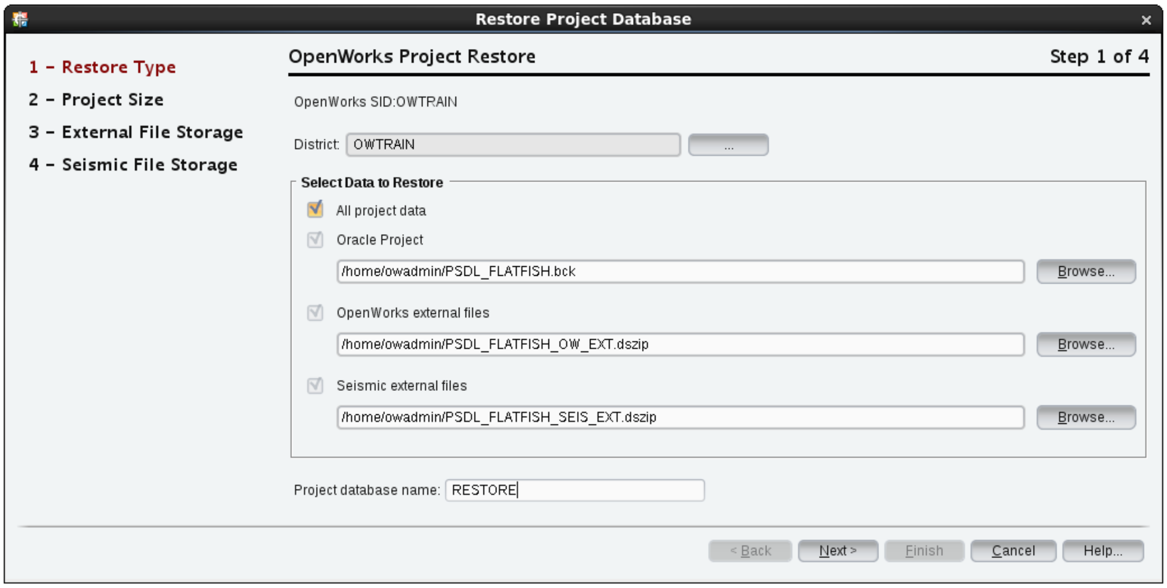
6. Click **Browse…**for the Seismic external file selection. Highlight the file you created in the previous exercise, and click **Select**.



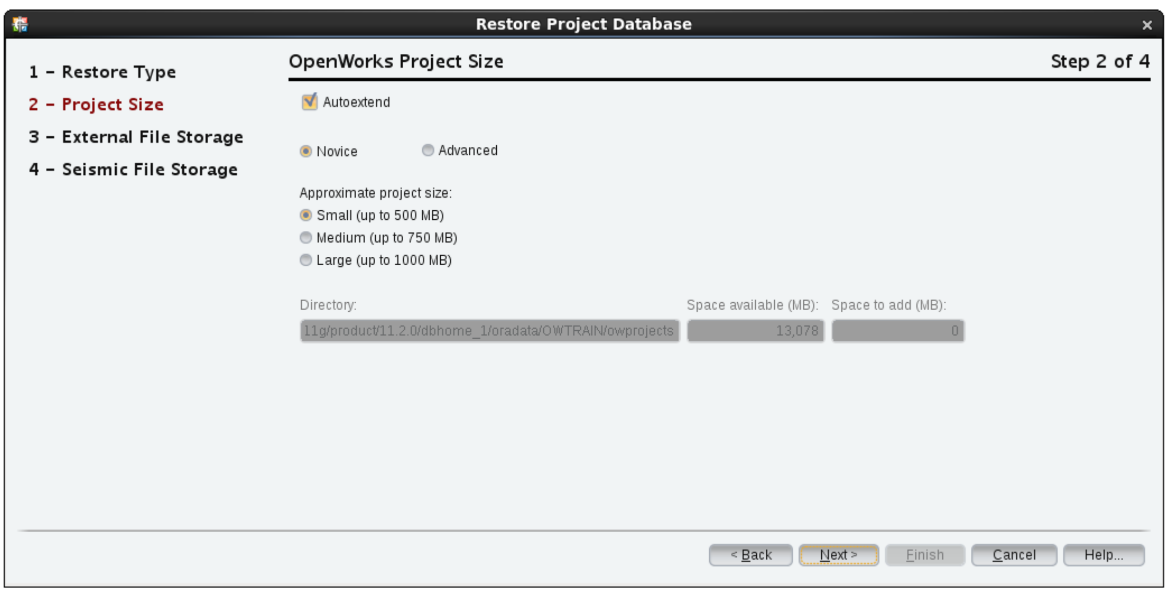
7. Enter **RESTORE** as the Project database name.

   If you are just restoring Oracle data, or if you are restoring Oracle and external files at the same time, the project database same you specify must be new in the Oracle instance.

If you are restoring external files only, the project database name must already exist in the Oracle instance (a Browse (...) button will appear to select the name of a project database).



8. Click **Next** to go on to step 2 (Project Size) of the wizard.



When creating an OpenWorks project, you can specify the size and some extending and allocation features.

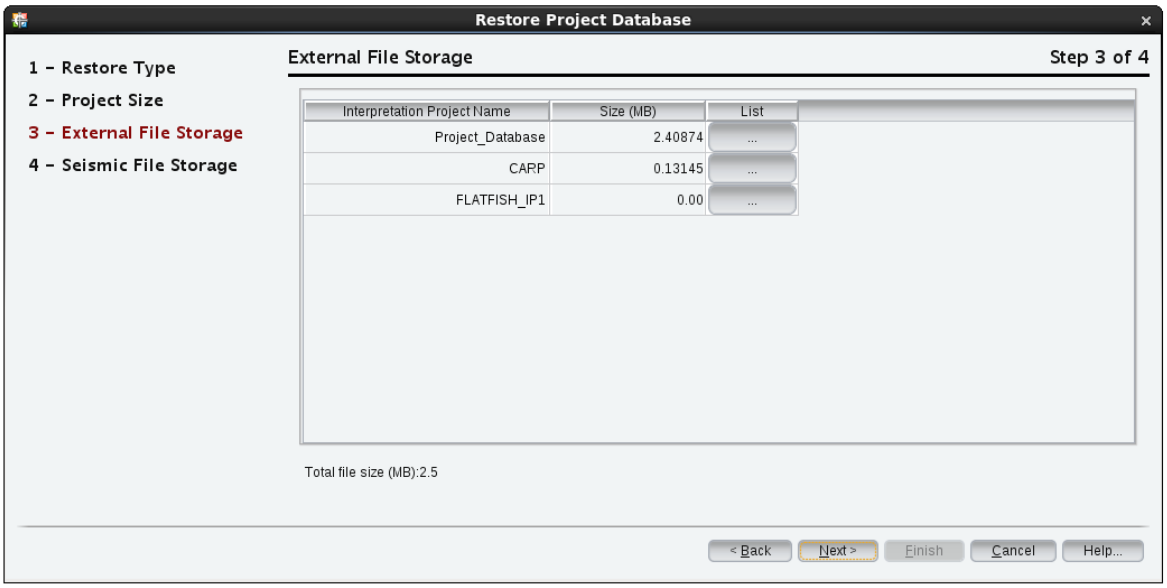
- *Autoextend* enables an automatic increase of the physical space for the project as the project requires more space (uncheck if you only want to increase the space manually)

- *Novice* allows you to select an initial maximum size for the project and allows the database system to decide where to put the project's tablespace on the file systems available to that Oracle instance (use *Approximate project size*)

- *Advanced* allows you to more precisely select an initial maximum size for a project and to decide where to locate the project's tablespace (use *Space to Add*)

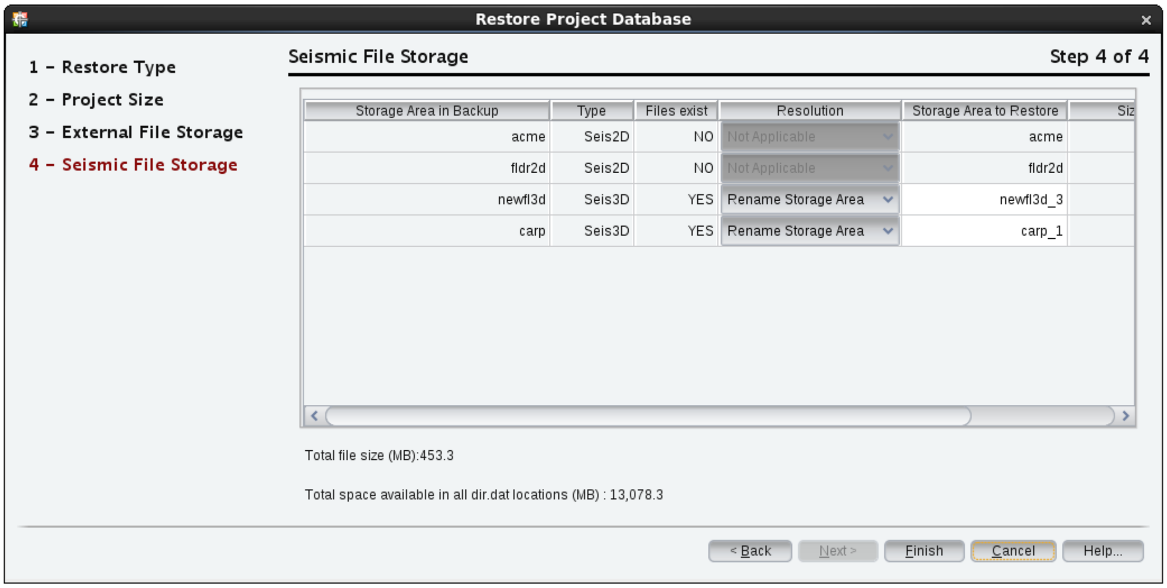
For this dataset, use the defaults for project size.

9. Click **Next** to continue with step 3 (External File Storage).



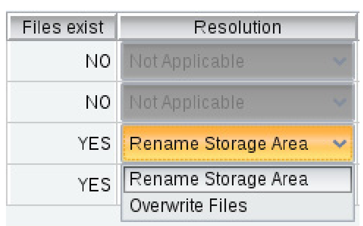
You can click **List…** to display the files to restore. Notice that files for the project database and files for the interpretation project will be restored.

10. Click **Next** to continue with step 4 (Seismic File Storage).



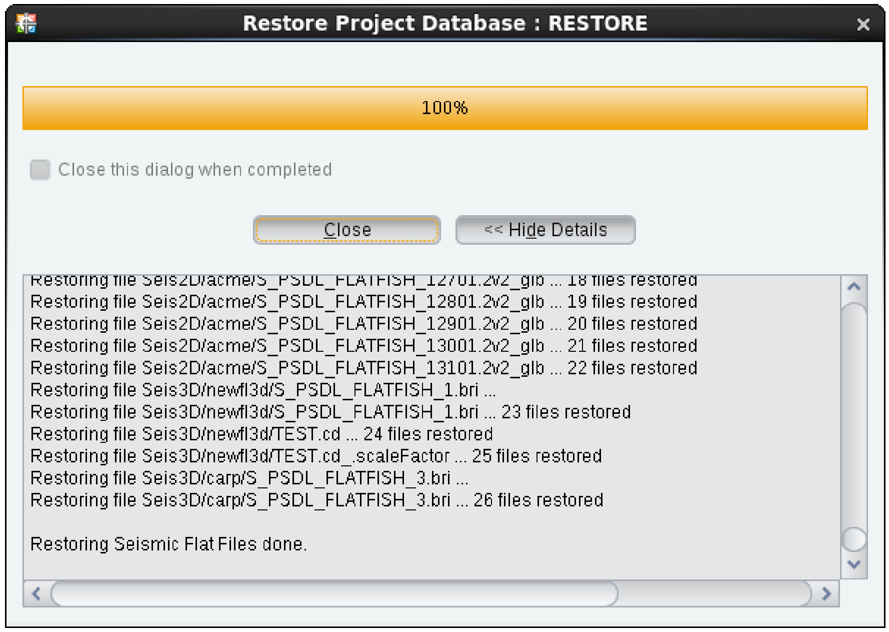
Again, you can click **List…** to display the seismic files to be restored. Notice that files are associated with 2D and 3D seismic surveys.

11. If the files exist, you can choose either of the **Rename Storage Area** or **Overwrite Files** options. For now, select **Rename Storage Area**.



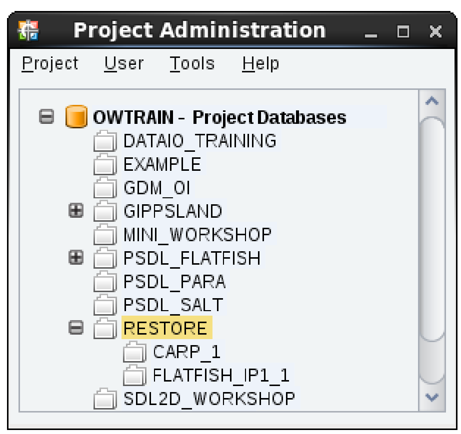
12. Click **Finish** to start.

A message dialog displays reporting information for the restore process. The *No Details/Details* toggle will turn off the report in the dialog. There is also an option to automatically close the dialog when the restore is finished.



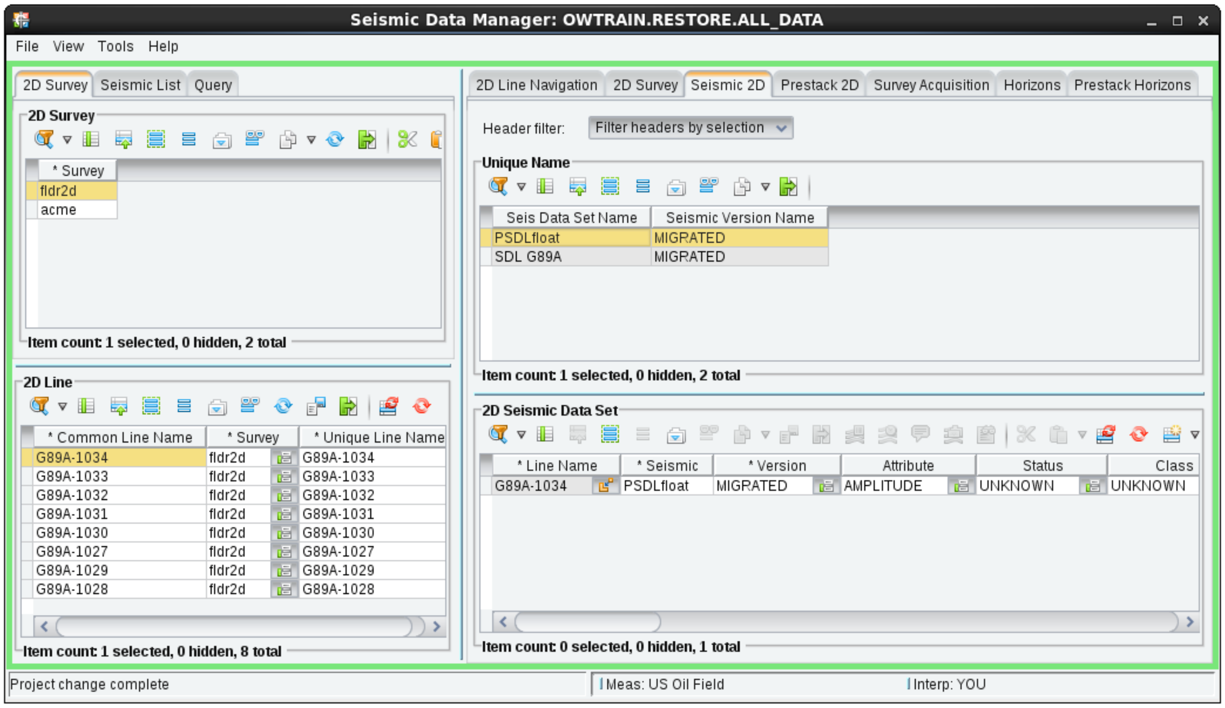
13. Click **Close** in the *Restoring Project Database* report to exit.

The restored project and any associated interpretation projects are now listed in Project Administration.



It is a good idea to check the restore by accessing the project in an OpenWorks session in Seismic Data Manager and DecisionSpace

Geosciences (or another applicable OpenWorks application for viewing seismic data).



Exercise 7: Copying an Existing Oracle Project for Disconnected Use

In this exercise, we will put in practice the new embedded database support for disconnected use, this embedded database is an alternative database platform with SQLite.

You can administer projects and data in an embedded database with the same tools that you are familiar with in dealing with projects and data in an OpenWorks database instance in an Oracle database; however, the embedded database allows you to have a project that only you have access to, or which may be on a laptop, disconnected from any other computer or network.

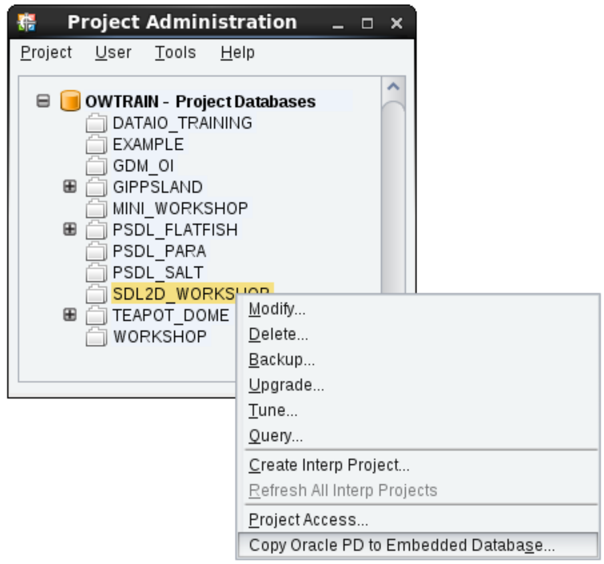
We will use the new district created in the previous exercise; Embedded_DB.

The following exercise illustrates the process to copy an existing Oracle project with seismic data to this embedded database.

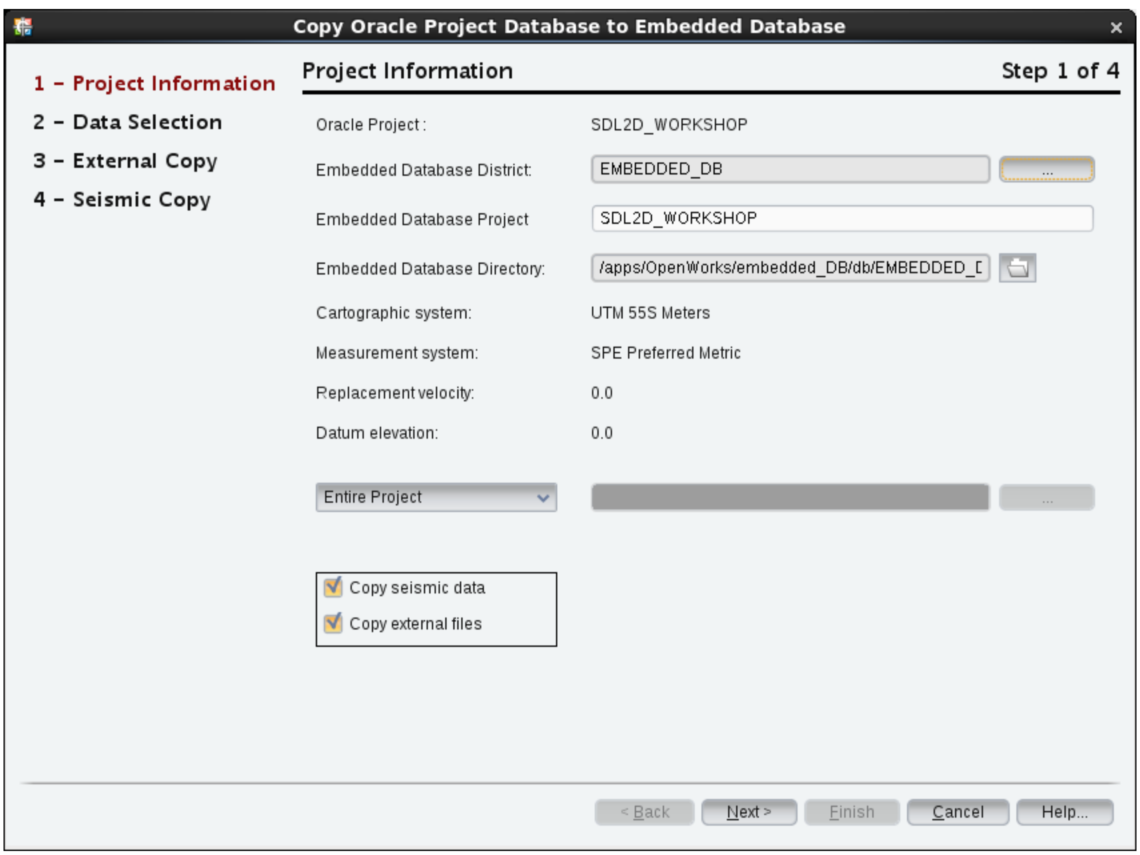
Once the embedded database **Embedded_DB** has been created, you can create a new project or copy an existing Oracle project to this embedded database.

1. Start **Project Administration** from the OpenWorks command menu. Select the project database **SDL2D_WORKSHOP** that you

want to copy, right-click this project to open the menu and select **Copy Oracle PD to Embedded Database**.



The **Copy Oracle Project Database to Embedded Database: Project Information** screen appears.



2. Select the **Embedded Database District** to which the project will be copied. In our exercise, there is only one district. It is possible to have multiple local Districts and SIDs.

Enter a name for the Database Project, by default it is the same Oracle database project.

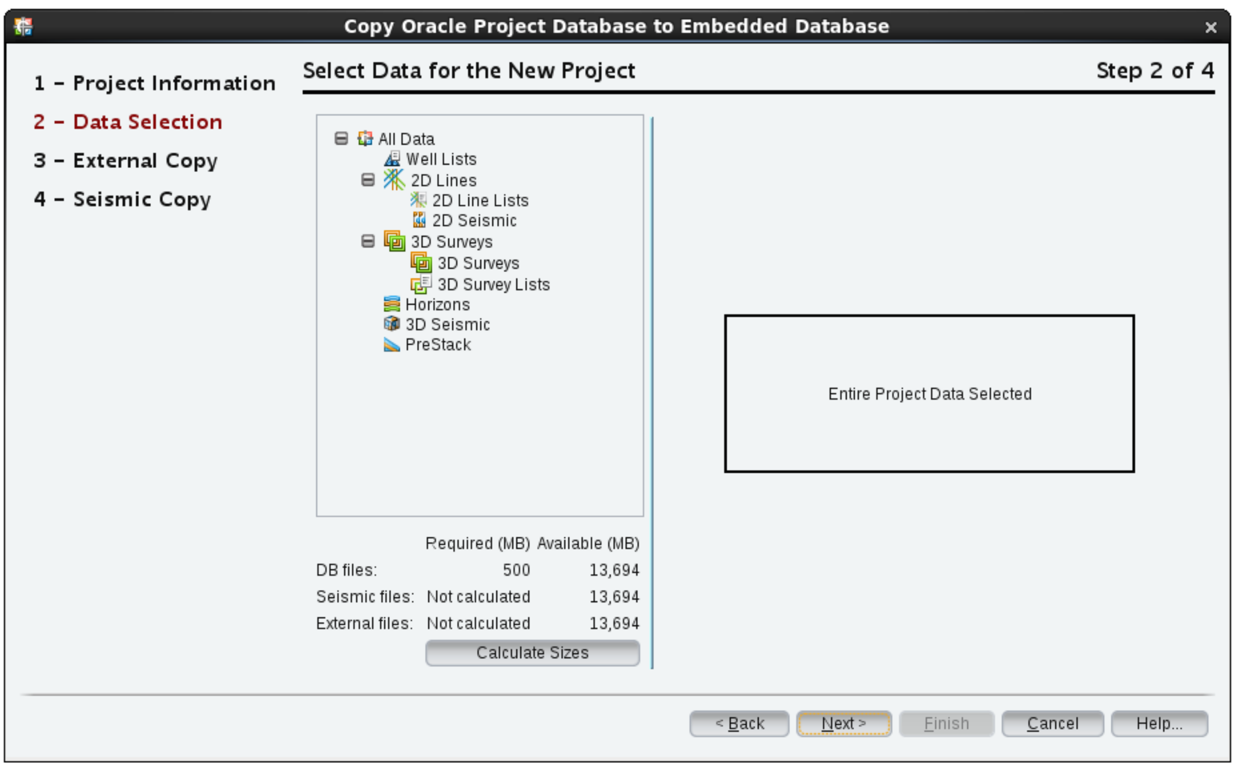
Select the Database Directory location, by default it is the same directory that you defined when you created the embedded database.

It is possible to have database files in multiple locations. This allows users to keep projects on different disks or partitions. It is also possible to copy the entire project, or just a subset of the project. In this exercise, we will copy the entire project.

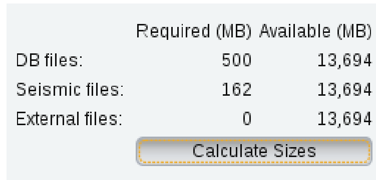
Leave all options by default.

3. Click the **Next** button.

The **Data Selection** screen helps you define a subset of the area. You will skip this screen as we selected **Entire Project** in the previous step.

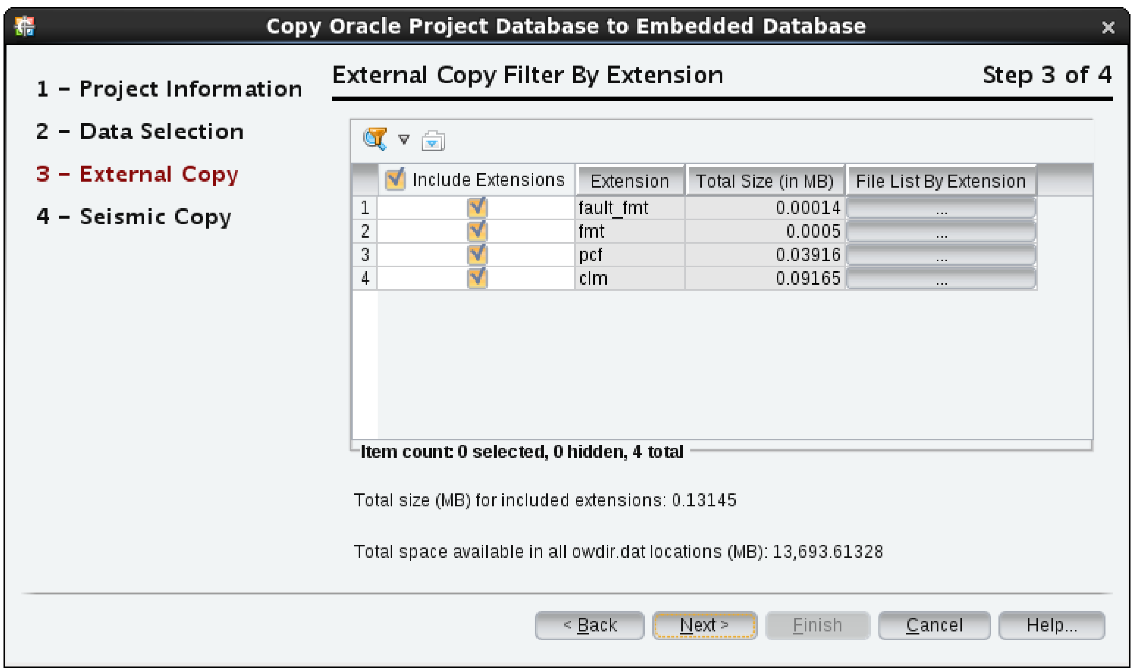


4. Optionally, you can calculate the total sizes for the project, for it, click the **Calculate Sizes** button.



5. Click the **Next** button.

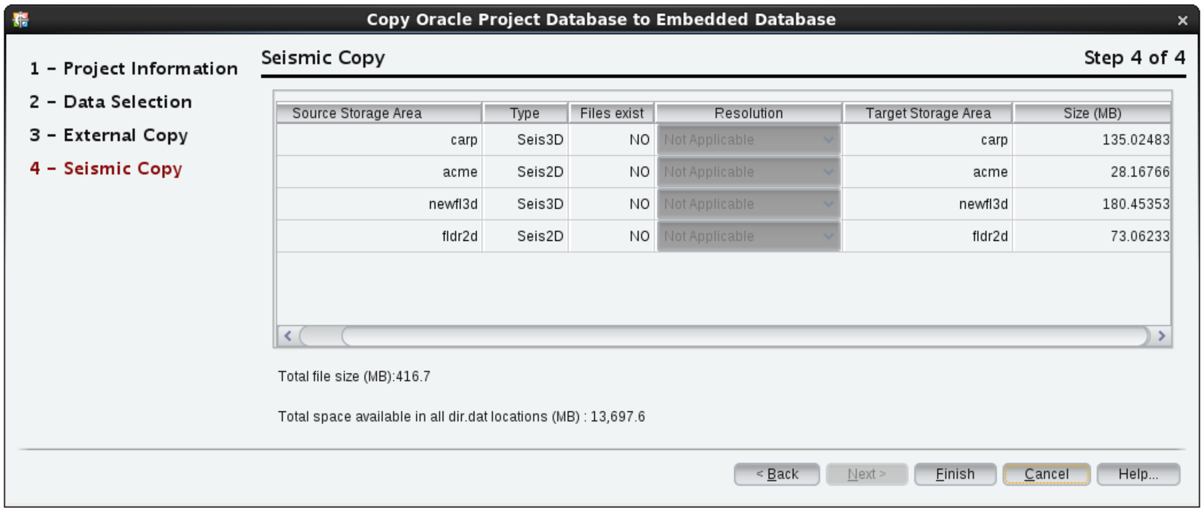
The External Copy Filter by Extension Screen allows you to select and filter external files for copying to an embedded database. These files include only the external files for the project.



If external files are not stored on the local machine, a user will not be able to access those files when disconnected from the network. Here, you will copy these files to the local machine, so disconnected users can access the data. This panel will show how much data will be copied. Users can choose to copy all of the data, or just a subset.

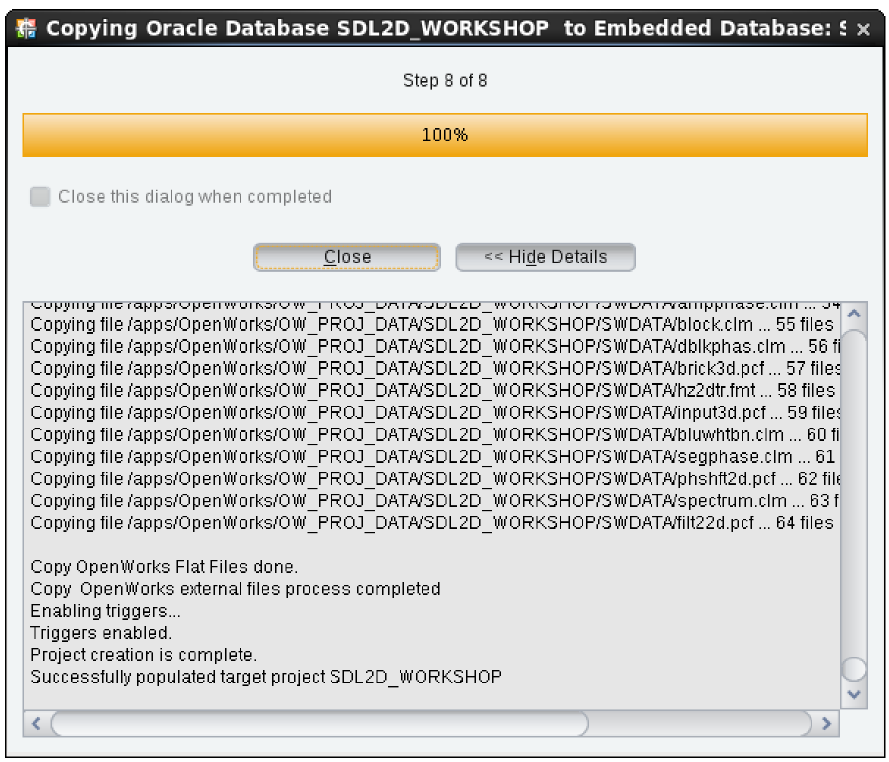
Leave this option as the default.

6. Click the **Next** button.



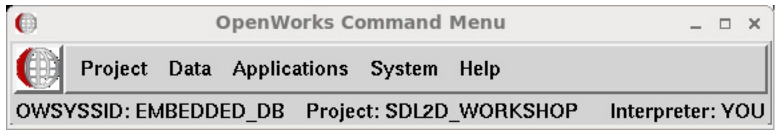
This final screen allows you to view all seismic files that will be copied. Leave this option as the default.

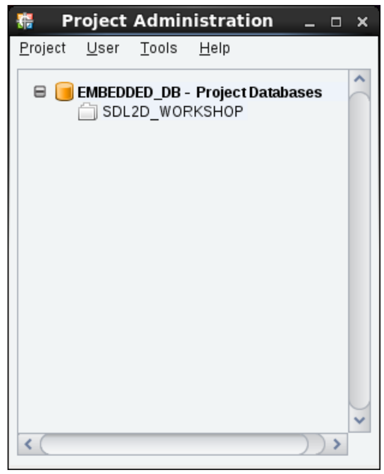
7. Click the **Finish** button. The project transfer process starts and copies the external files and seismic data.



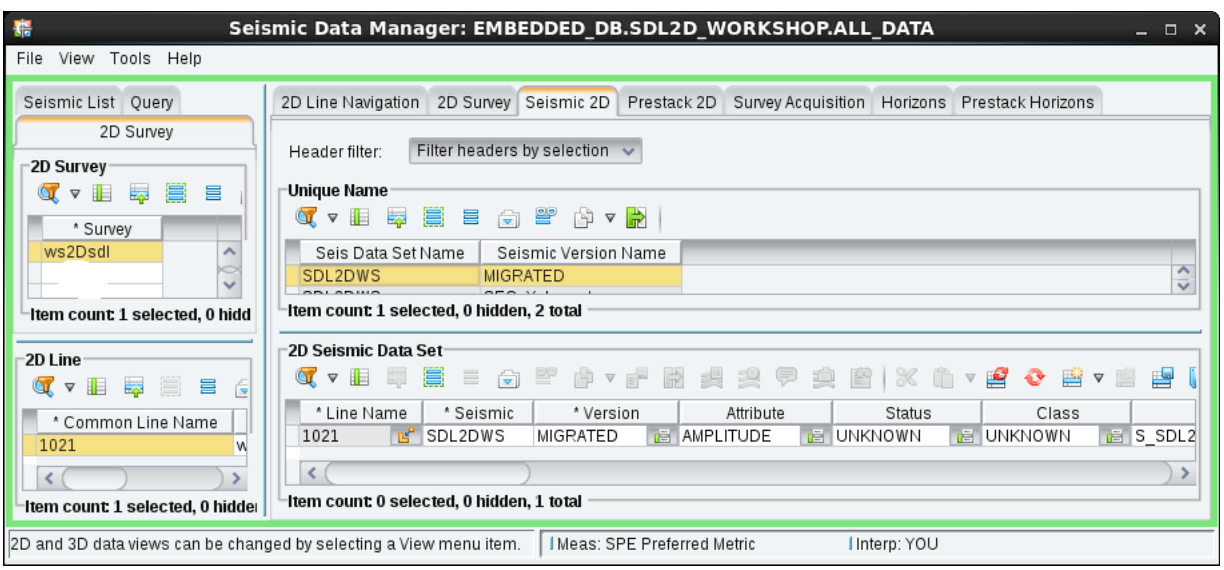
8. Once the local project has been created from the Oracle project database, the Embedded_SID can be selected in **Project Status**

Tool, selecting the new **District** for the embedded database created, after that, Project Administration will allow you to modify the new project copy locally and work offline.





9. In order to check the locally copied project, select **Start > Seismic Data Manager from Data > Management > Seismic Data Management**.



Chapter 8

Seismic Tools and Utilities/Managing Horizon and Fault Data

This chapter data focuses on management options available in Seismic Tools and from a series of command line utilities. Seismic Tools tasks include exporting or importing fault and horizon data, managing fault data, and converting seismic volumes from one landmark format to another.

Course Overview

Topics covered in this class include:

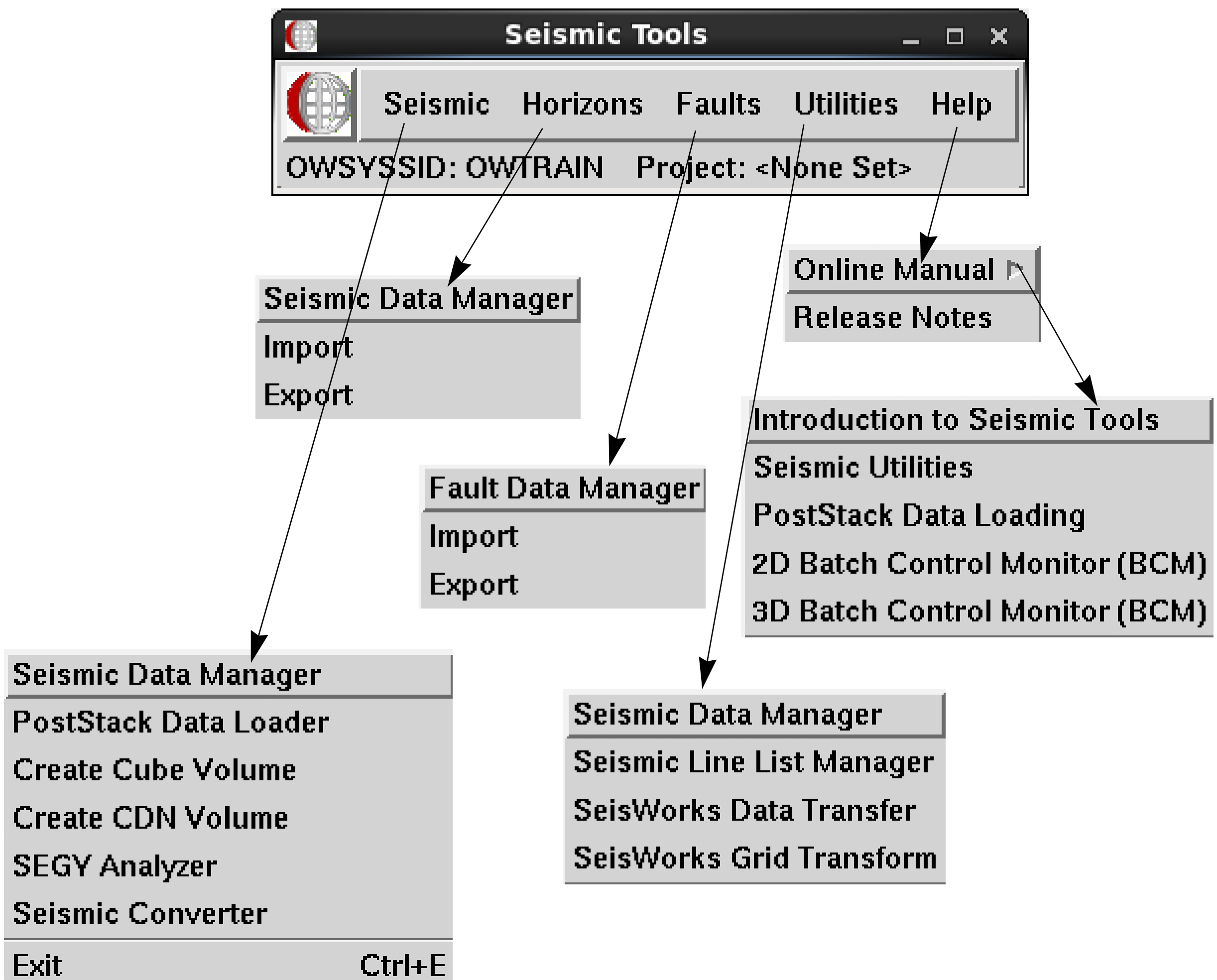
- Seismic Tools and Utilities
- Managing Horizon Data
- Managing Fault Data
- Data Import/Export Wizard for Fault Data
- Seismic Converter
- Command Line Utilities

Data Management: Seismic Tools

Seismic Tools provides access to a collection of utilities for use in managing databases, interpretation projects, and interpreted (horizon and fault) data.

Some of the Seismic Tools utilities (for example, PostStack) can be accessed from within SeisWorks software; however, Seismic Tools allows you to manage data and perform other tasks without having a full SeisWorks and/or PostStack software license.

To access Seismic Tools, select **Data** > **Management** > **Seismic Tools** from the OpenWorks command menu.



Menu Options

Seismic

- Seismic Data Manager -access Seismic Data Manager
- PostStack Data Loader - access PostStack Data Loader
- Create Cube Volume - create a cube volume to use with ZAP!
- Create CDN Volume - create .cdn file from .3dv, .bri, .cmp (optimized for OpenVision)
- SEGY Analyzer - analyze SEG Y Data
- Seismic Converter - convert 3D seismic data files between .3dv, .bri, .cmp and create .3dh (timeslice) formats

Horizons

- Seismic Data Manager - access Seismic Data Manager
- Import - import horizon data
- Export - export horizon data to an ASCII or binary output file or MFD Z-MAP Plus) file

Faults

- Fault Data Manager - sort, delete, query, update, rename, and print fault interpretive data stored in the OpenWorks database
- Import - import ASCII fault files to the OpenWorks database
- Export - export fault planes to ASCII files

Utilities

- Seismic Data Manager - access Seismic Data Manager
- Seismic Line List Manager - create 2D seismic line lists
- SeisWorks Data Transfer - transfer seismic navigation, trace, and horizon data from one Project database to another
- SeisWorks Grid Transform - compute corner point coordinates for a 3D survey

Help - Online Manual, Release Notes

- Introduction to Seismic Tools
- Seismic Utilities
- PostStack Data Loading
- 2D Batch Control Monitor
- 3D Batch Control Monitor

Most of the *Seismic* menu options are used for data loading and have been covered in the previous data loading chapters. This part of the manual concentrates on horizon and fault management options and includes an exercise using Seismic Converter.

Managing Horizon Data

In this section, you will learn about:

- 2D and 3D horizon data
- Deleting horizon data
- Renaming horizons
- Importing and exporting horizon data using Mltimp and Mltexp

How Horizon Data is Stored

There are two main tables in the OpenWorks database involved in the cataloging and management of horizon data:

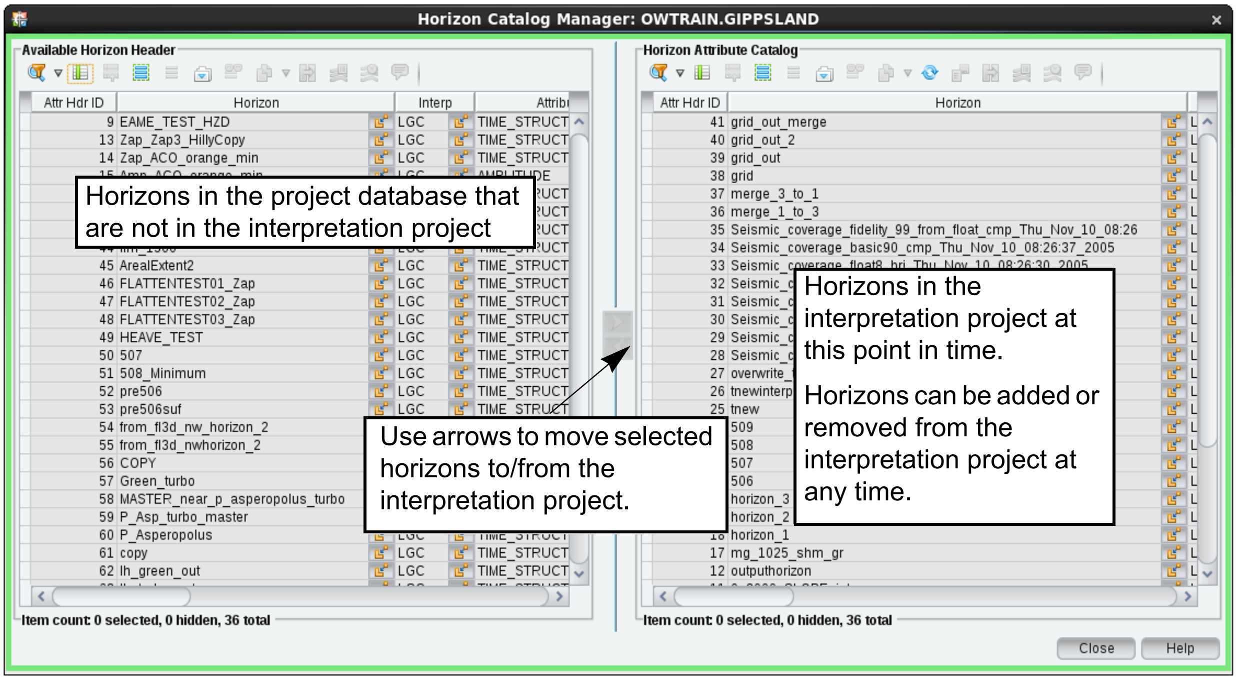
- Horizon Attribute Header
- Horizon Data

Horizon Attribute Header is the top level definition of a horizon. Each row in this table represents one horizon that can be defined on any number of 3D surveys or 2D lines in an OpenWorks project.

For each 2D line or 3D survey where a given Horizon Attribute Header is defined, a row in the Horizon Data table is created. For a horizon created in a 3D survey, this row contains the name of the external file containing the horizon data. For a horizon created on a 2D line, this row contains the horizon data defined for that line. 2D horizon data is stored in the database - there are no external files for 2D horizon data.

Each Horizon Data row is linked to a single Horizon Attribute Header and a single 3D survey or 2D line.

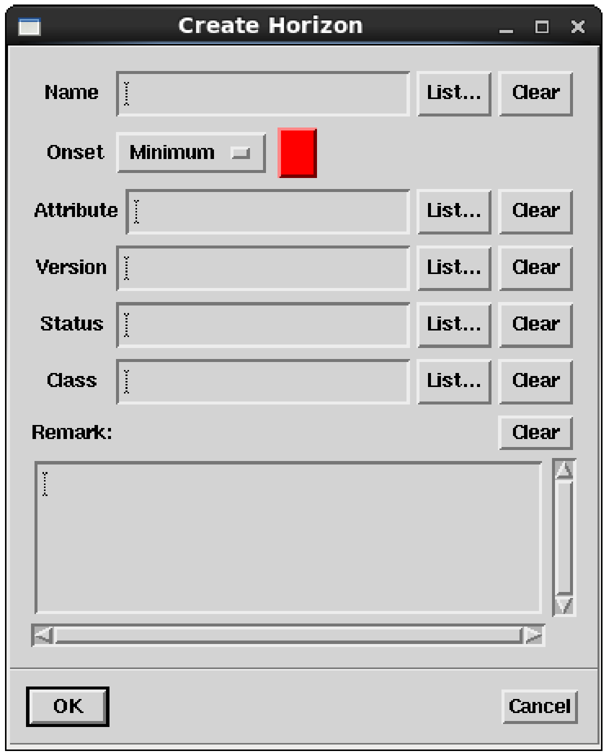
Another table, Horizon Catalog, is important to horizon management in interpretation projects. Horizon Catalog contains the subset of Horizon Attribute Headers that are available to an interpretation project. It also contains the headers of all the horizons in the project database, which can be added to the interpretation project at any time by simply selecting them for inclusion in the interpretation project.



3D horizons are stored in external (tiled) files with an .hts extension. When this tiled horizon file (.hts) is created, tiles are only written where a horizon has been interpreted. No pre-allocation of disk space occurs and the horizon is created instantaneously. The size of the horizon file is proportional to the degree of interpretation on that particular horizon.

Horizon Names

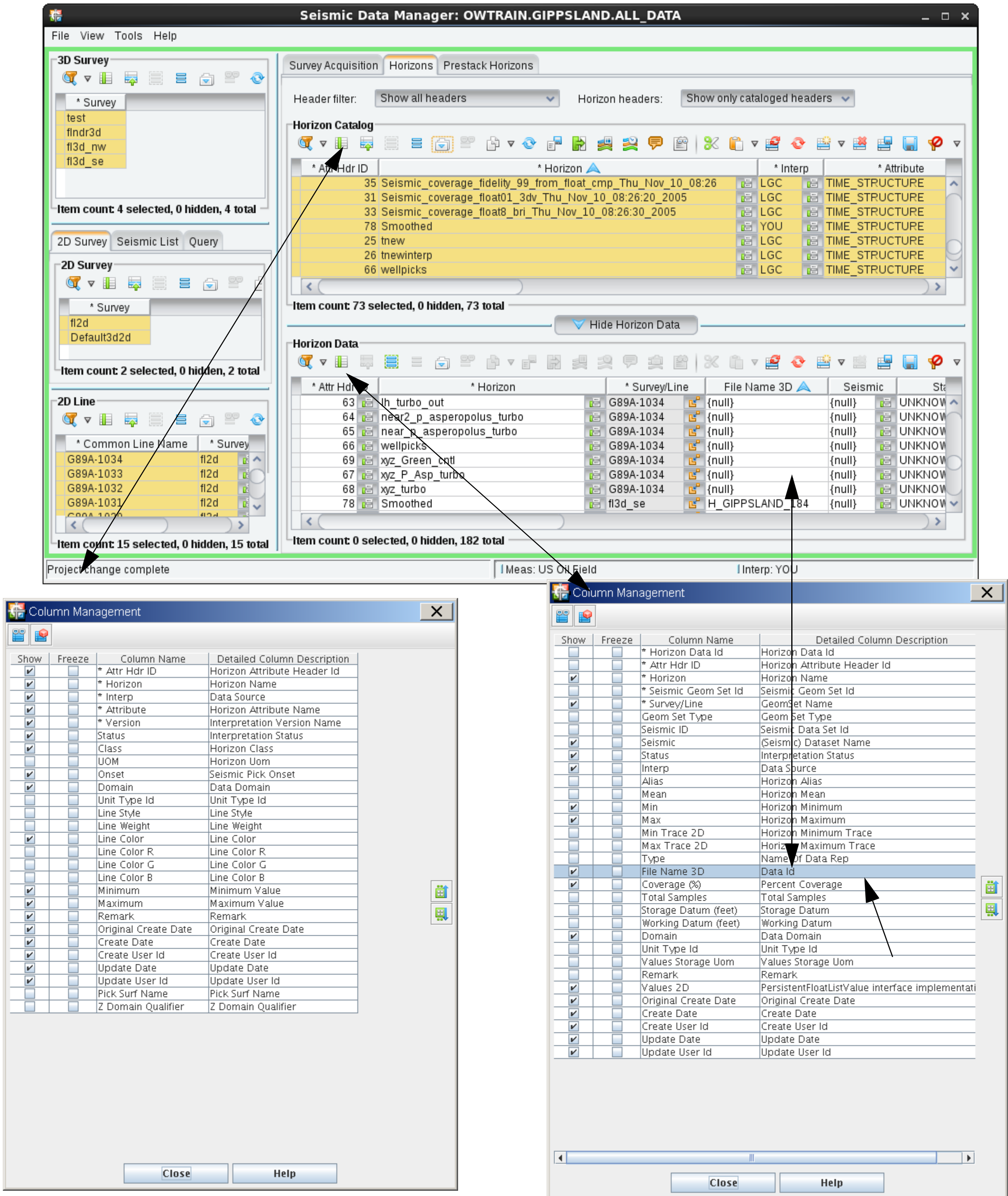
When a horizon is created, the user specifies a name and other key attributes needed to create the Horizon Attribute Header table and uniquely identify the horizon. Horizons are accessed using this name definition in OpenWorks applications.



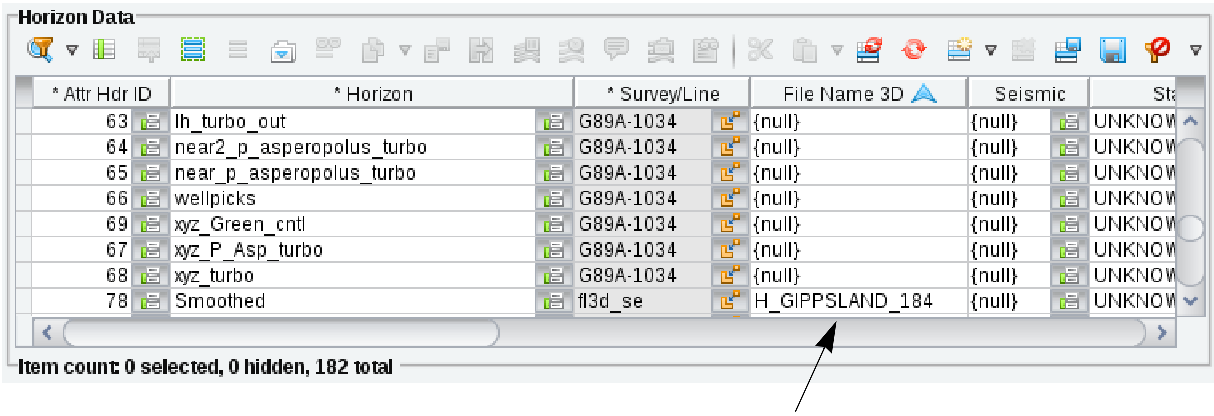
User supplied horizon information:

- Name
- Onset
- Color
- Attribute
- Version
- Status
- Class
- Remark

This information is used to create the Horizon Attribute Header, which can be viewed in Seismic Data Manager. A list of all the columns in this table can be viewed in the *Column Management* dialog box. Columns can be turned off and on and rearranged to suit the user, then saved as the default view using **Tools > Save application Preferences as User Default**.



For 2D data, the horizon data for the selected horizon name is read directly from the database. For 3D data, the horizon data is read from an external file assigned to the horizon name. To see the actual physical file name associated with a 3D horizon, toggle on **File Name 3D** in the *Horizon Data Column Management* dialog box. The name displays in the Horizon Data pane in Seismic Data Manager.



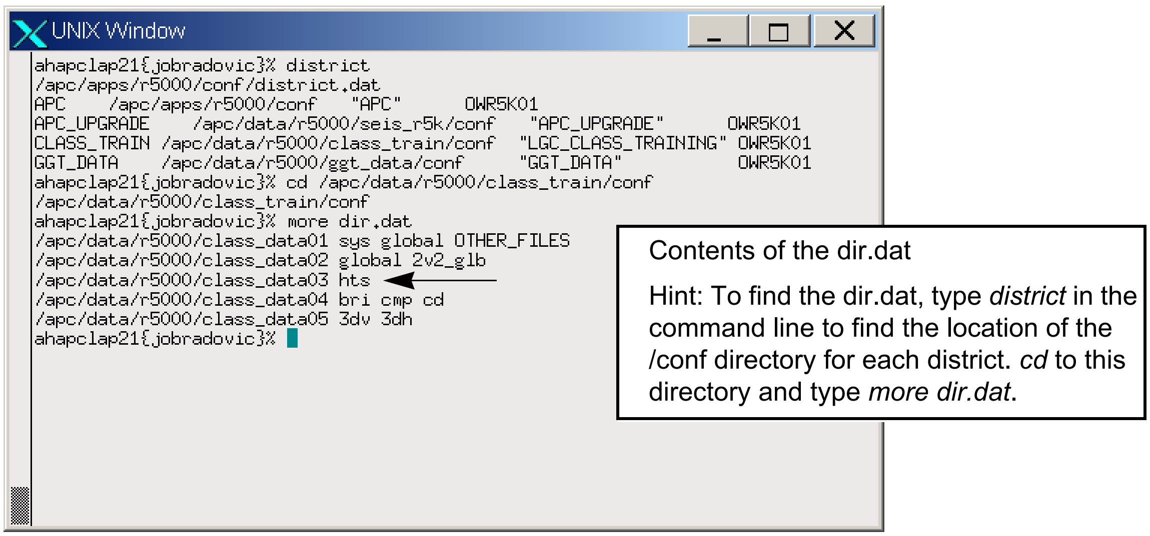
3D Horizon File Naming Convention

The naming convention for 3D horizon files is as follows:

H_<OpenWorks Project Database Name>_<Horizon Data ID>.hts

The Horizon Data ID is a number created by OpenWorks. The file name has no obvious connection to the user name, so Seismic Data Manager allows you to determine the *user name* to *actual file name* association.

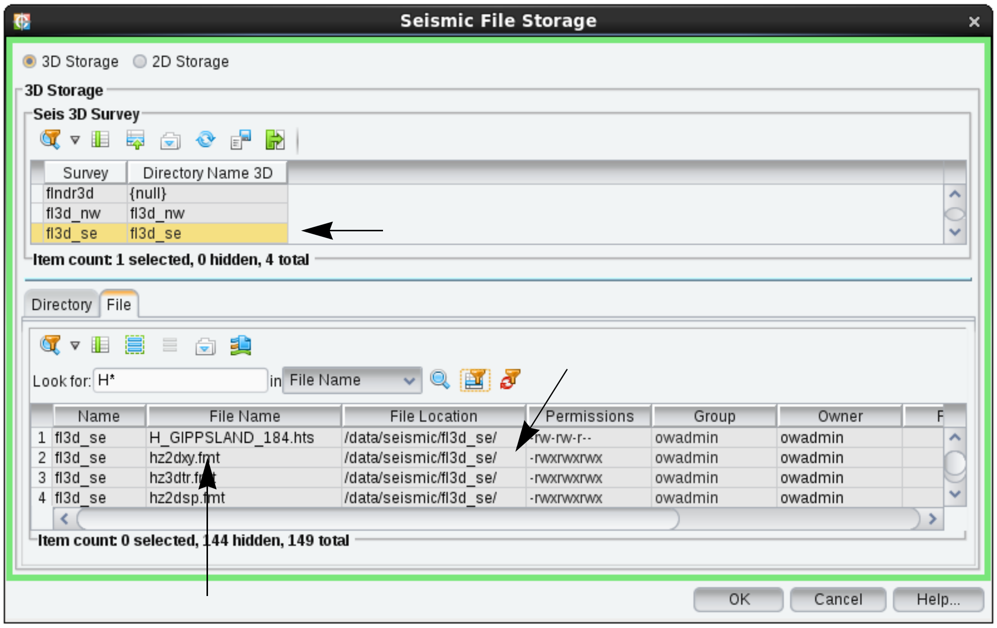
The directory path to the file is determined by the dir.dat and the paths created using the Seismic Files Storage tool when the 3D survey was created. If a directory was created for seismic file storage from a path in the dir.dat with an hts extension specified, the horizon file will be placed in that directory path. Otherwise it will be place in the directory path assigned to OTHER_FILES in the dir.dat.



The path used to store 3D horizons for the district in this example is */apc/data/r5000/class_data03*.

This path can also be viewed in Seismic Data Manager, so it is not necessary to find the path in the dir.dat for your horizon file.

To see the actual path in Seismic Data Manager, select **Tools > Seismic File Storage…** and select **3D Storage** and the **File** tab. For each horizon file name, the directory path is listed in File Location.



Importing and Exporting Horizon Data

Seismic Tools Mltimp, Mltexp

Horizon data can be exported to Landmark's Z-Map Plus as well as to applications from other vendors using the Mltimp/Mltexp utilities.

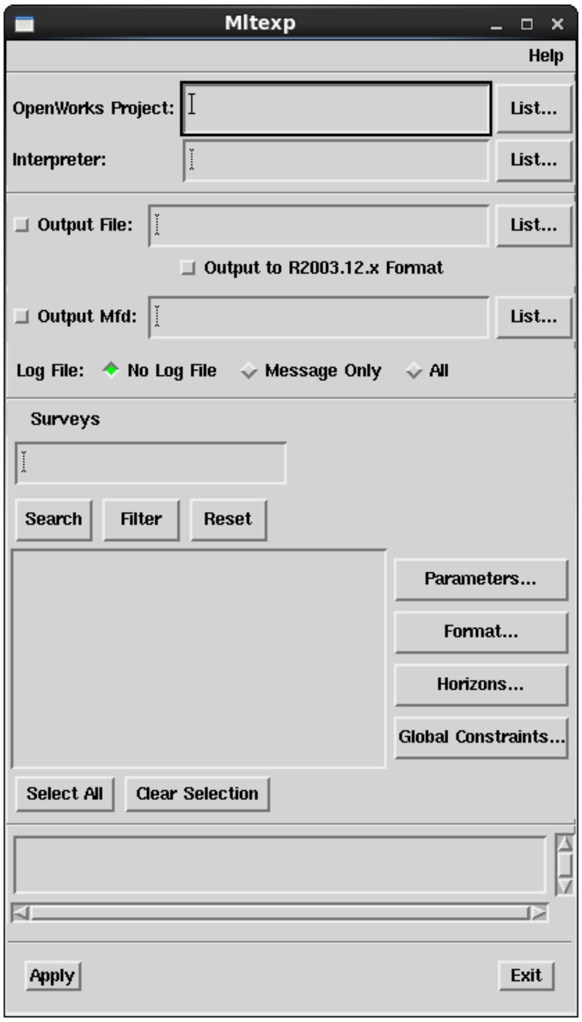
These utilities are accessed from the Seismic Tools, **Horizons > Import/Export**.

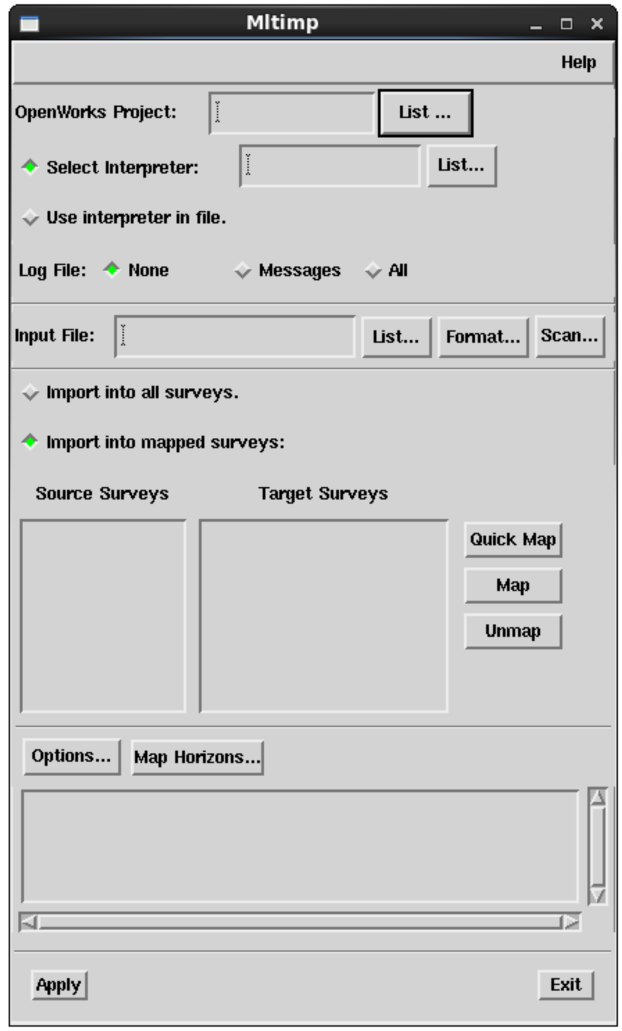
Mltimp and Mltexp will also launch from a UNIX command line.

Horizons menu options in Seismic Tools:

- Seismic Data Manager (launches Seismic Data Manager)
- Import (Mltimp)
- Export (Mltexp)

Mltimp and *Mltexp* dialog boxes are shown below.





When you import or export data, you must specify a format file. Landmark provides a default format file and several alternative format files. You can control column and format definitions in a custom format file.

Mltimp and Mltexp

The Mltimp and Mltexp utilities import and export multiple horizons to and from an OpenWorks project database or an interpretation project.

Mlt formats can be in either binary or ASCII form. When you choose an Input File in the Mltimp utility, the application tells you whether the file was exported using the Mlt ASCII or Mlt binary format. This information displays in the bottom panel of the *Mltimp* dialog box.

Input Files with Mlt formats can import many horizons at once.

If an Input File is not an Mlt ASCII or Mlt binary format, a message box tells you that you are working with a Legacy Format. The Legacy Format is in a Hie (Horizon Import/Import) or Hie-like format. (Hie is an older horizon utility replaced in Release 5000.0.0 by Mltexp.)

Importing Horizon Data

Before you attempt to import horizons, you must ensure that the following conditions have been met:

- For legacy files (ASCII files not in the expected Landmark Mlt format) you can use a default format file or create a custom format file.

- If you intend to use the default format file, the ASCII file to be imported must conform in structure to the specifications of the default format.

- If you intend to use a custom format file, it must already reside in the appropriate OW_PROJ_DATA/SWDATA directory. The format file must have an *.fmt* suffix.

- You must know the exact name of the ASCII file for import.

- You must know what value is used as a null value in the ASCII file.

  A null value is a value used as a place holder in the ASCII file. It does not have any significance as data. You specify this value when you define an import job in order to avoid it being interpreted as a data value.

The default format for a horizon import job is coded into the import software so that it cannot be deleted. Consequently, no such format file appears in the OW_PROJ_DATA/SWDATA directory.

The default format file for 3D data has the following appearance:

	`          1`
Column Nos.	`1234567890123456`
Record 1	`LINE    21  30  2`
Record 2	`TRACE   31  40  2`
Record 3	`Z       65  76  4`
Record 4	`FLTFLG  77  80`

This default format specifies that a single horizon is to be imported from the ASCII file. The following column specifications are defined.

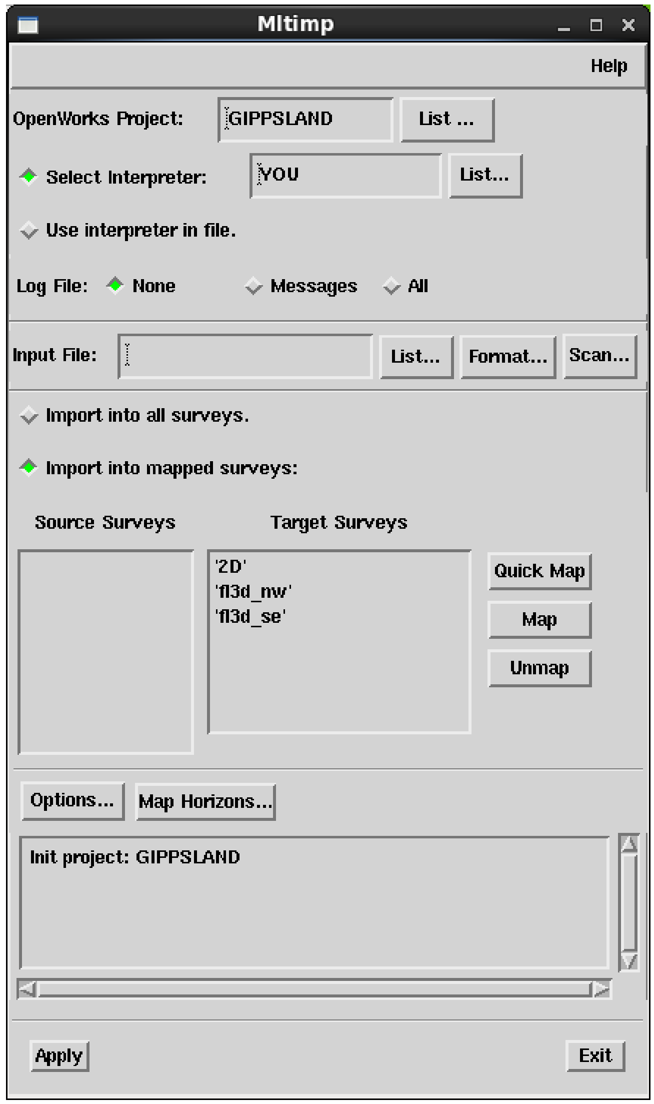
Data Elements	Start column	End Column	Decimals
Line number	21	30	2
Trace number	31	40	2
Z value	65	76	4
Fault Flag	77	80	

Example Workflow Using the Mltimp Utility

Landmark Mlt Format workflow:

Setting up Mltimp

1. Start the Mltimp utility from a command line, or select **Horizons > Import** in the Seismic Tools main menu.



2. Click the **List...** button next to OpenWorks Project.

3. Highlight a project, and click **OK**.

   The project name appears in the OpenWorks Project text field. In addition, the following occur:

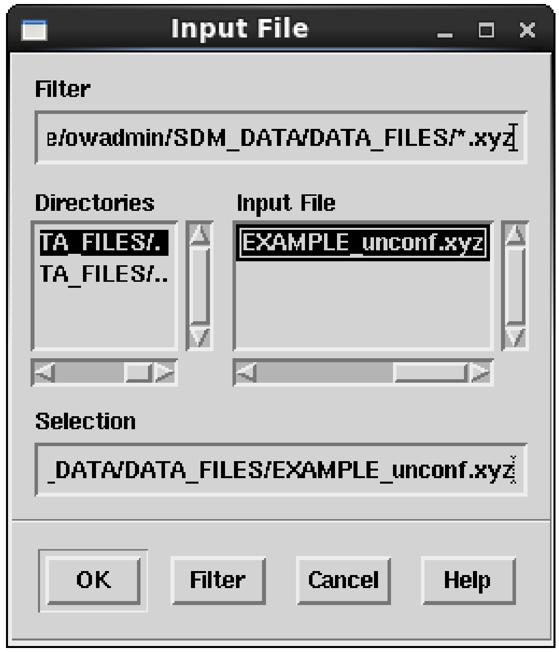
   - The Interpretation ID associated with the project appears in the Select Interpreter text field.
   - The surveys contained in the project appear in the Target Surveys panel.
   - The words "Init project" followed by the name of the project appear in the bottom panel of the dialog box.

   You can write a log file each time Mltimp runs. To choose the log file option you want, select one of the following in the top panel of the dialog box:

   - No Log File - (default)
   - Message Only - Duplicates the status box to the log file
   - All - Writes the message as well as data point test results to the log file, displays whether a data point is imported or rejected and provides the point coordinates or input string.

4. In the *Mltimp* dialog box, click the Input File **List...** button.

5. When the *Input File* dialog box appears, select an Input File.



If Legacy formats were not used, the Scan button is inactive. This button lets you examine the contents of a Legacy file.

At the same time, names appear in the **Source Surveys** panel, and the following information appears in the bottom panel:

- the cartographic system for the project and in the file, if it exists
- which formats were used in exporting the file, such as lines or traces
- whether all coordinates were used during export

- how the import coordinate system is set -for instance, line and trace

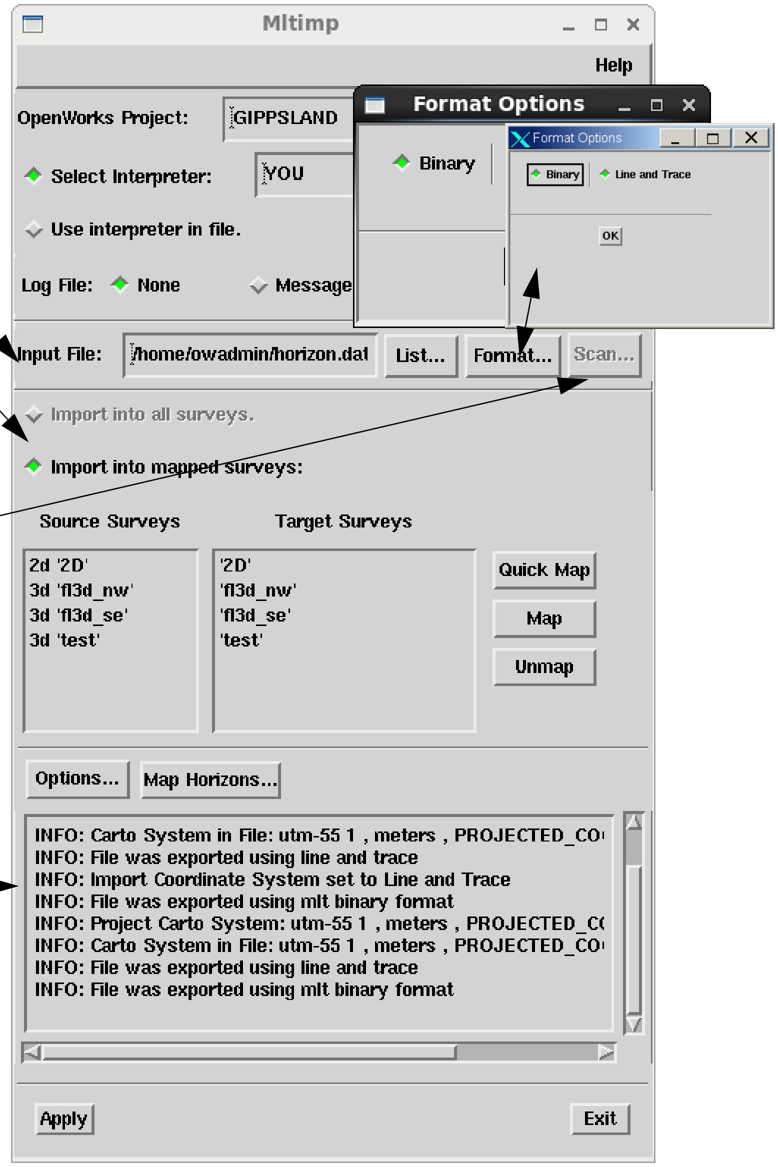
Mltimp Dialog Box with input file seleceted:

The input file name appears in the text field after a selection is made from the **List...** dialog.

At the same time, the software fills out the **Source Survey** panel.

In this example, legacy formats were not used, so the **Scan...** button is inactive. This button is used to view the contents of a legacy file.

The bottom panel tells you that the file was exported using the mlt binary format. It also contains information about the cartographic reference systems for the project and file, how the file was exported (line and trace), and how the import system is set.



You can use the following environmental variable to set preferred directories for import/export files (defaults to $HOME directory):

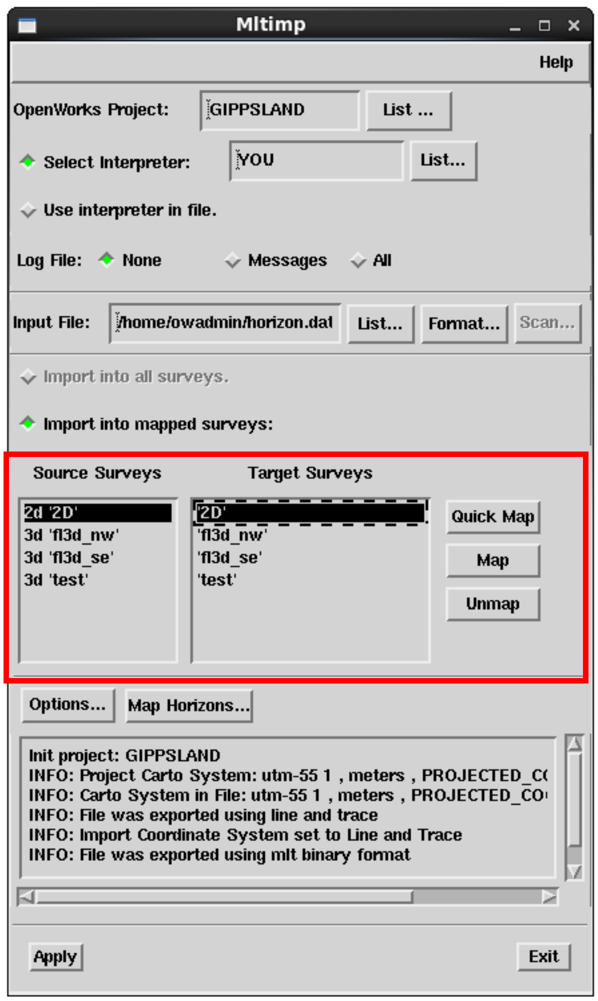
LGC_SW_IE_DIR

Mapping Surveys

Once Source Surveys and Target Surveys are listed, you must map source to target.

1. Highlight a **Source Survey**.

2. Highlight a **Target Survey**.



Survey Map Options:

Quick Map:
Matches the source survey with the closest name to the target—you don't have to select the survey to use this option.

Map:
Highlight the source survey and the target survey, then click **Map** (you choose the surveys)

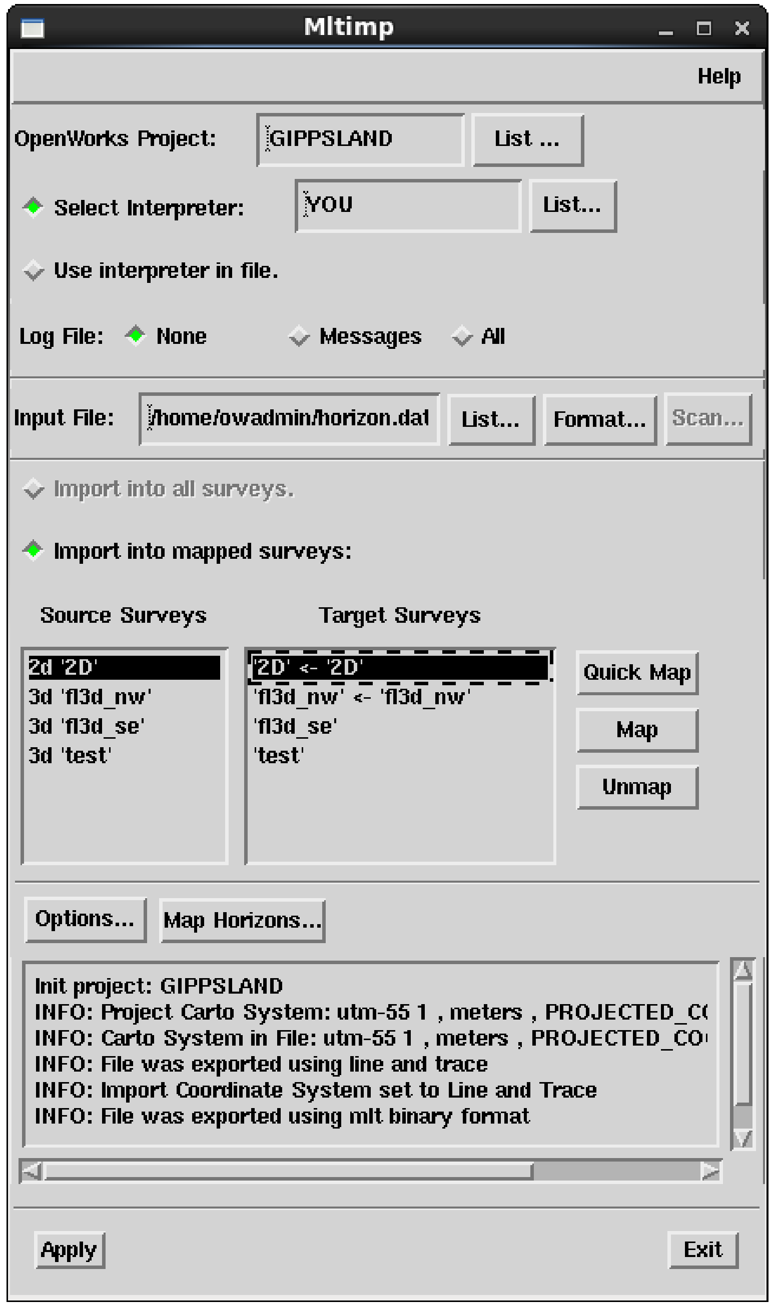
Unmap:
Removes any mapped survey assignments

3. Click the **Map** button in the **Map Surveys** column on the right side of the dialog box.

4. In the **Target Surveys** panel, the name of the Source Survey will be appended to the name of the Target Survey, as the following example shows:

   '2D' <-'2D'

'fl3d_nw' <-' ' fl3d_nw '



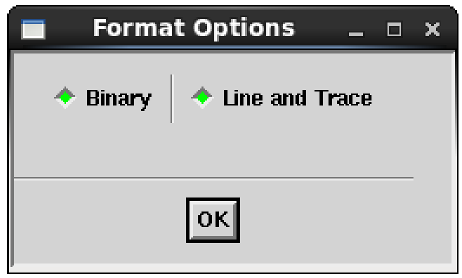
Map Surveys options:

- When you click **Map**, the Mltimp utility uses the selected Source Survey and maps it to the selected Target Survey.
- When you click **Quick Map**, the Mltimp utility selects the survey closest in name to the Target Survey.

- The **Unmap** button undoes your mapping choice.

5. Click the **Format** button.

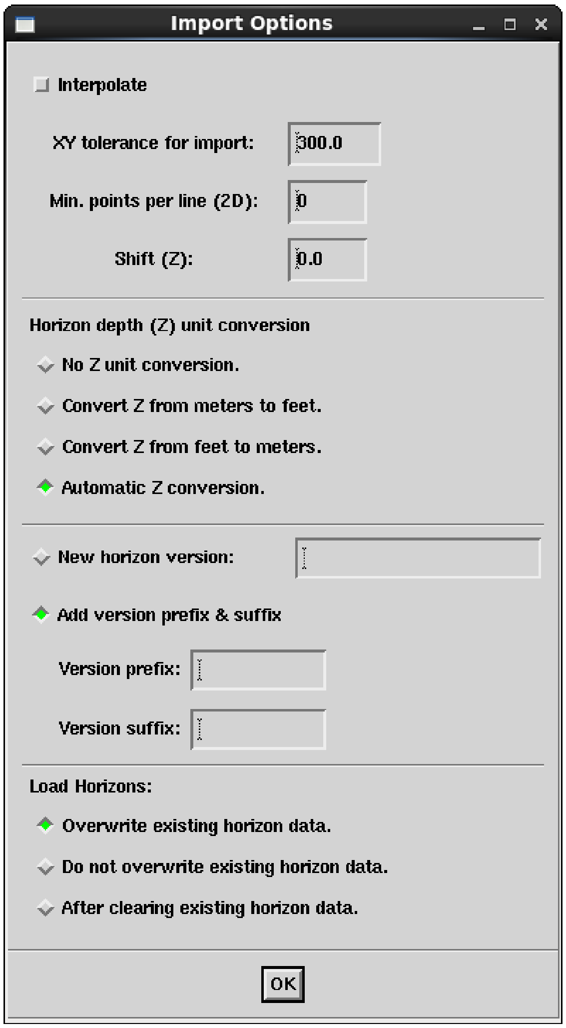
   If the exported file used an mlt binary format, the *Format Options* dialog box will resemble the following illustration, with *Line and Trace* selected by default:

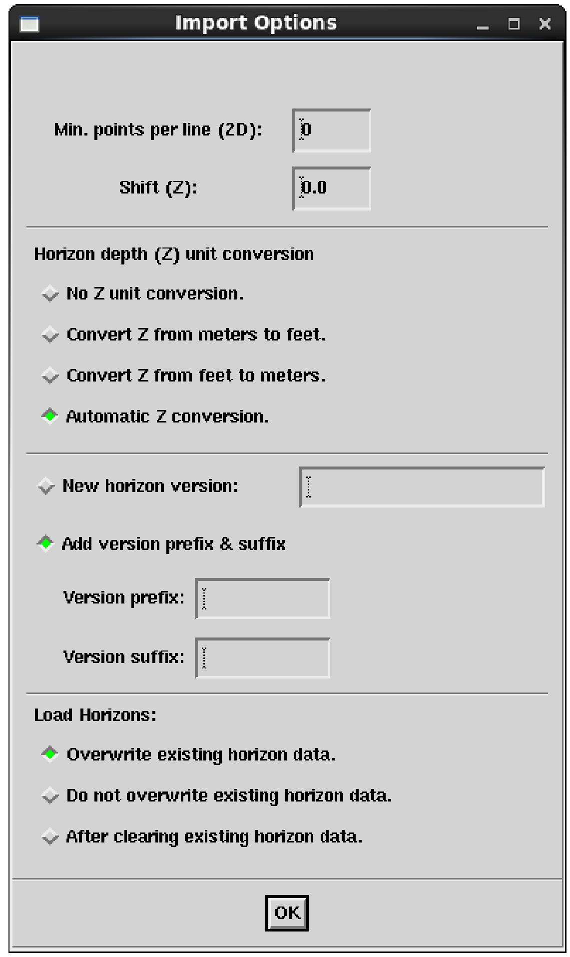


6. Click on **OK**.

7. In the *Mltimp* dialog box, click **Options**.

The *Import Options* dialog box appears. The interface at left is displayed when you are working with the ASCII or binary format; the interface at right appears when you work with Legacy Formats.



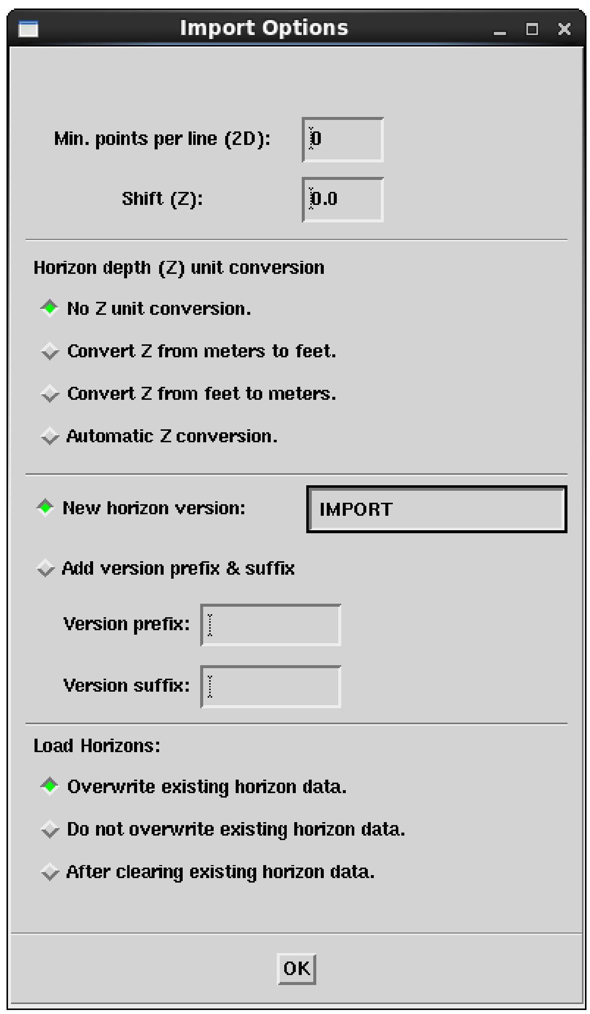


The chart below explains the choices in the *Import Options* dialog box.

Option	**Function**
Top panel: Available only when using Legacy Formats	
Interpolate	Fills in gaps in horizons. Off by default. Available when using Legacy Formats only.
Xy Tolerance for Import (ASCII only)	The input horizon value will be written to the nearest grid point that is within this tolerance. This option appears in the *Import Options* dialog box only with files exported using x/y values. Available when using Legacy Formats only.
Top panel: Available in all versions of dialog box	
Min Points per Line (2D)	The utility will import only those 2D lines that have at least the number of points specified in this text field. For instance, if you typed in the value 5, a line with only 4 points would not be imported. The default is 0

Shift (Z)	Let you type in a number by which you would shift the z value. The default is 0.0.
New Horizon Version	Let you specify a new horizon version name on
Use New Horizon Version	Lets you specify a new horizon version name on all horizons in the import file.
Add Version Profile & Suffix	Toggled on by default, this option lets you specify a prefix and suffix for the imported horizon.
Version Prefix	Let you add a version prefix to the imported horizons. If the original version name contains UNKNOWN or UPGRADE, the software ignores these designations. In their place, the new version uses the prefix plus the suffix.
Version Suffix	Let you add a suffix to the imported horizons. If the original version name contains UNKNOWN or UPGRADE, the software ignores these designations. In their place, the new version uses the prefix plus the suffix.
Load Horizons:	
Overwrite existing horizon data	The default.
Do not overwrite existing horizon data	The utility will load all data, but only new, non-null data will be added. Existing data is not affected.
After clearing existing horizon data	The Mltimp utility erases the horizon data in a file and replaces it with all the data in the file of your choosing.

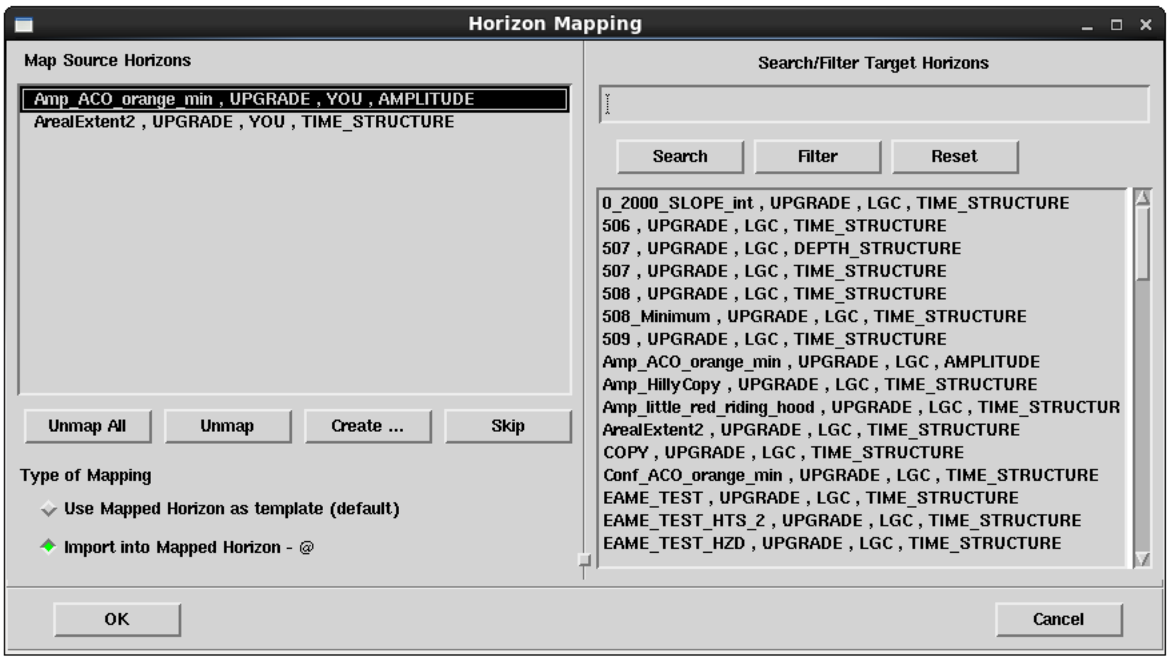
8. Make selections in the *Import Options* dialog box, as needed.



9. Click **OK** in the *Import Options* dialog box.

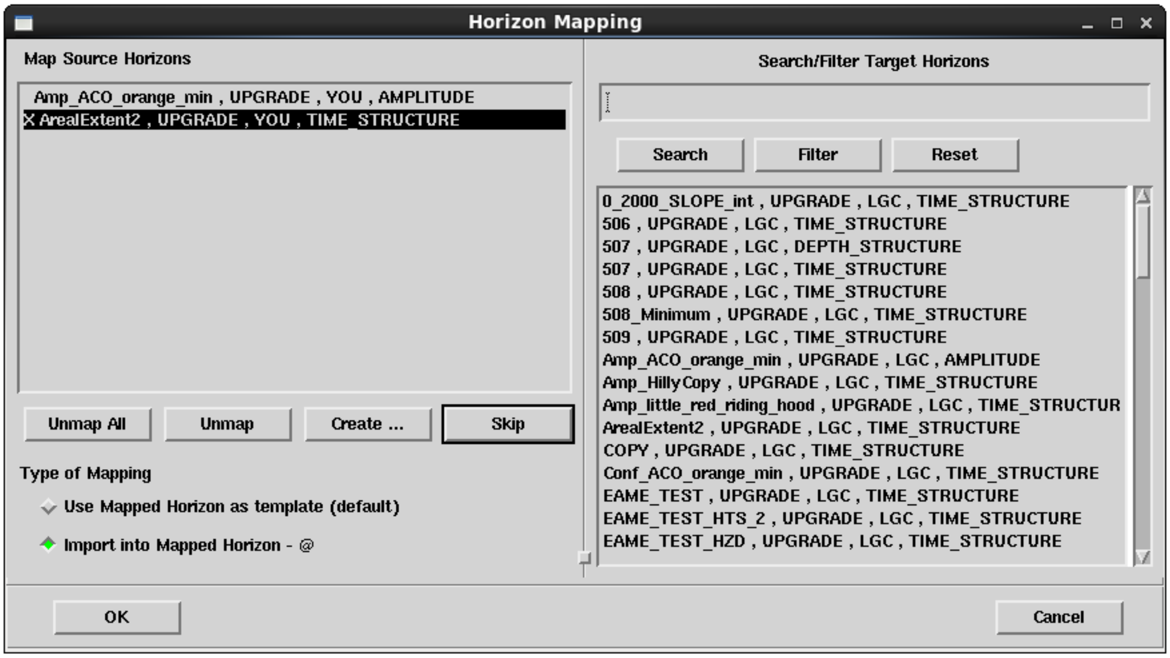
   Now, you can map the horizons you are importing to a horizon in the target survey or to a new horizon name.

10. Click on the **Map Horizons...** button at the bottom of the *Mltimp* dialog box.

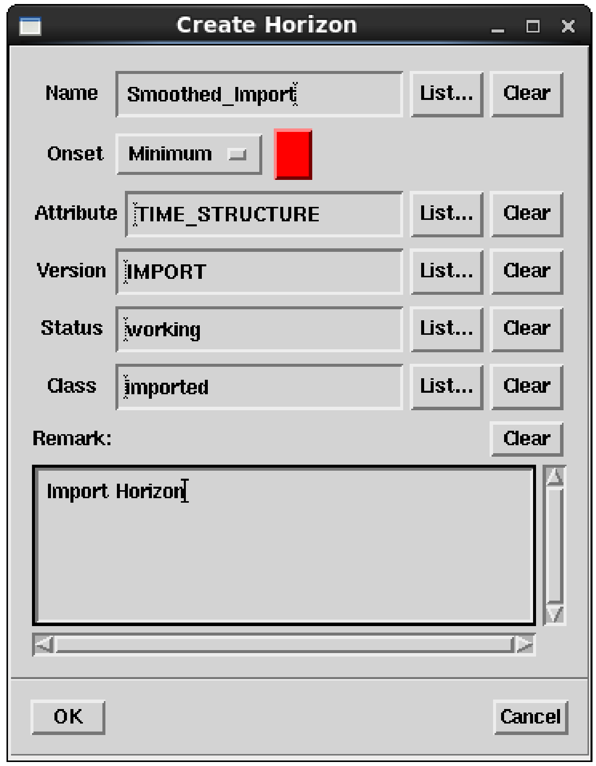


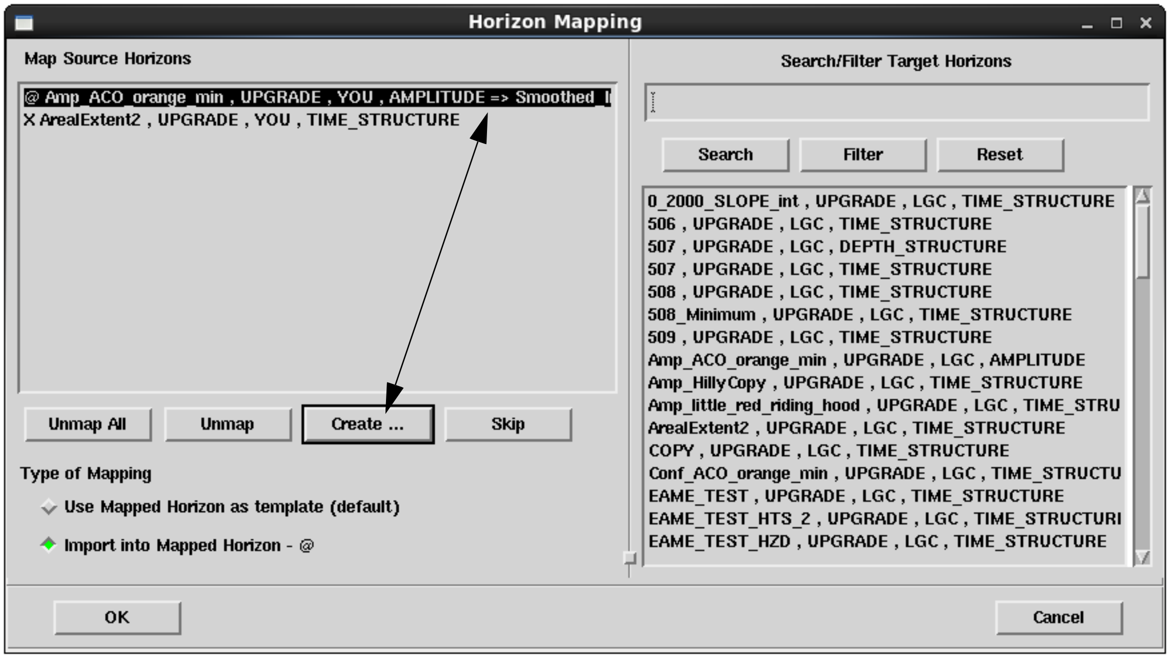
The left-hand panel displays Map Source Horizons which are the horizons that reside in the Input file that you chose in the *Mltimp* dialog box.

11. Highlight the horizon(s) you want to use. If several horizons are listed but you want to use only certain ones, highlight the unwanted horizons and click **Skip**. This process places an X in front of the horizon. Continue this process until you are finished.



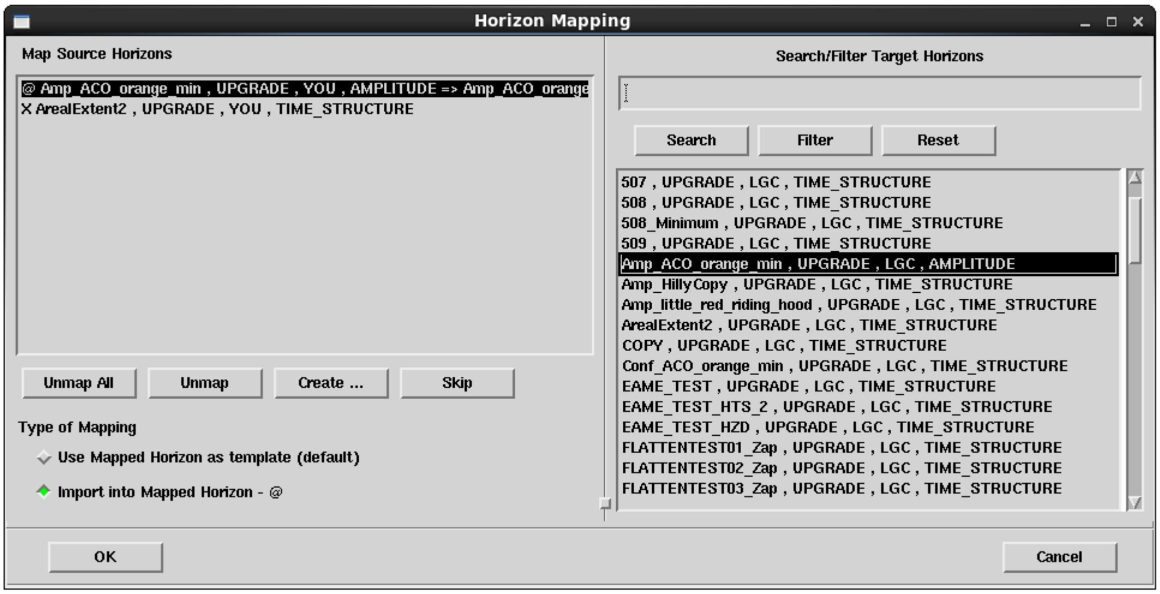
12. You can also create a new horizon name by clicking the **Create...** button and filling in the fields in the resulting *Create Horizon* dialog box. The name of the new horizon is then appended to the Map Source Horizon you have selected in the left-hand panel. This new name is highlighted.





13. If you want the imported horizon to map to an existing horizon (either overwrite or merge with that horizon), select the exiting horizon in the right-hand panel. (Use the search/filter capability to find it quickly.) By default, this horizon will serve as the template for the imported horizons.

You can write into the existing Mapped Horizon with the source horizon by toggling on Import into Mapped Horizon - @. The write option is defined in the bottom panel of the *Import Options* dialog box.



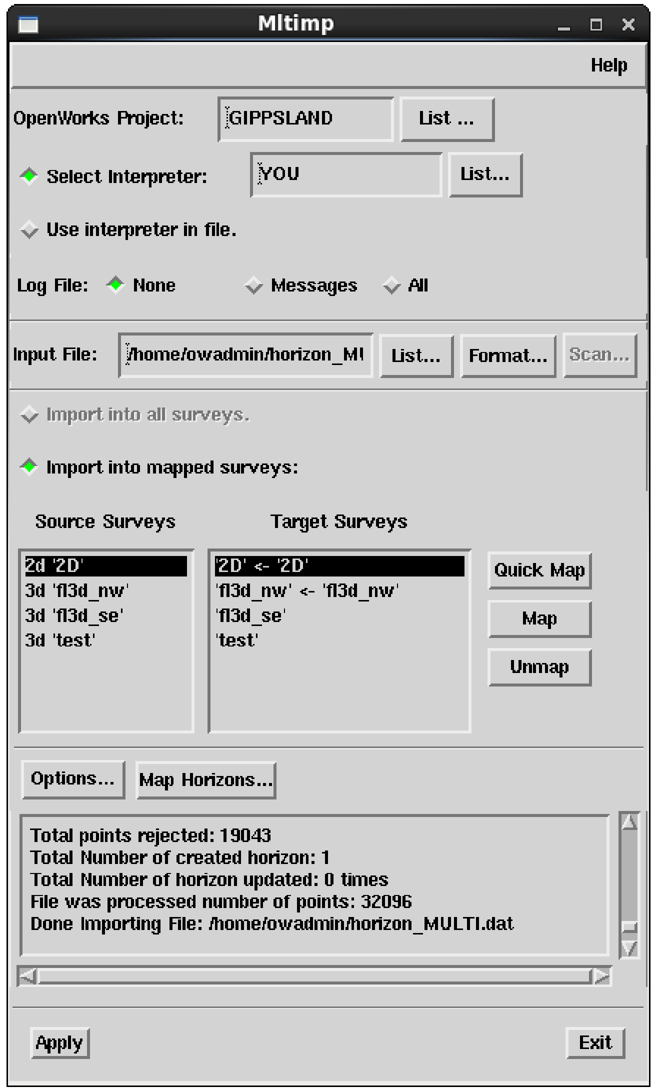
14. Click **OK** in the *Horizon Mapping* dialog box.

15. Click **Apply** in the *Mltimp* dialog box.

16. A progress box appears, then a Message telling you how many points were processed.

17. Click **OK** in the Message box to close it and the progress bar.

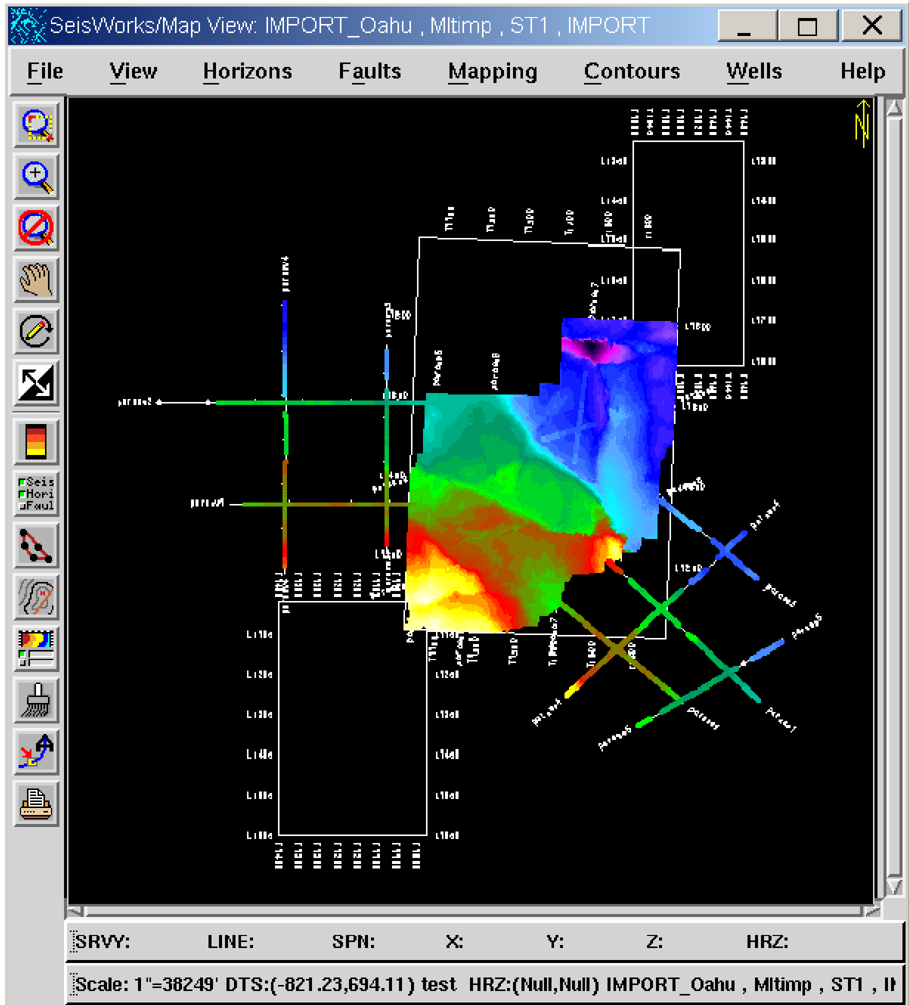
18. Examine the bottom panel of the *Mltimp* dialog box for information about the operation.



19. Click **Exit** to exit the utility.

20. Check your horizon in SeisWorks Map View or in WOW.

Imported horizon:



Exporting Horizon Data

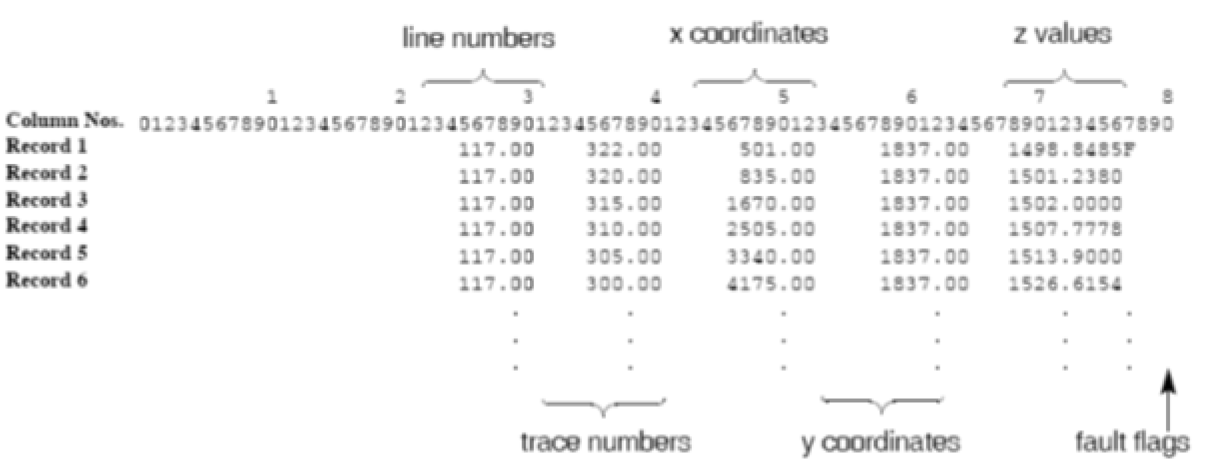
The default format for a horizon export job is coded into the export software so that it cannot be deleted. The actual default format file would have the following appearance:

```
                       1
Column Nos.  1234567890123456
Record 1     LINE    21  30  2
Record 2     TRACE   31  40  2
Record 3     X       41  52  2
Record 4     Y       53  64  2
Record 5     Z       65  76  4
Record 6     FLTFLG  77  80
```

The default format specifies that a single horizon is to be exported to the ASCII file (Legacy). Both line/trace and *x*,*y* coordinates will be exported.

Data Elements	Start Column	End Column	Decimals
Line number	21	30	2
Trace number	31	40	2
X	41	52	2
Y	53	64	2
Z	65	76	4
Fault Flag	77	80	

An output file created using this default format has the following appearance:



The default format will only allow you to export one horizon at a time.

Creating a Custom Format File

Use any text editor to create a custom format file for horizon import or export. A custom format file will allow you to import or export up to eight horizons.

The format file must have an *.fmt* extension and reside in the appropriate OW_PROJ_DATA/SWDATA directory. It also must have the following data elements:

Data Element	Start column	End column
Variable name	1	7
Start column definition	8	9
End column definition	12	13
Number of decimals	16	16

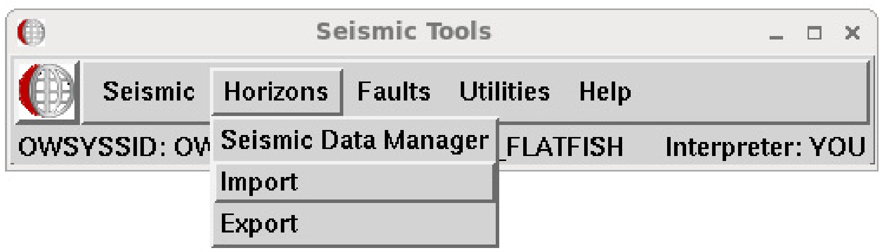
Exercises: Horizon Management

EXERCISE 1: Import a Legacy Horizon File Using the Default Format

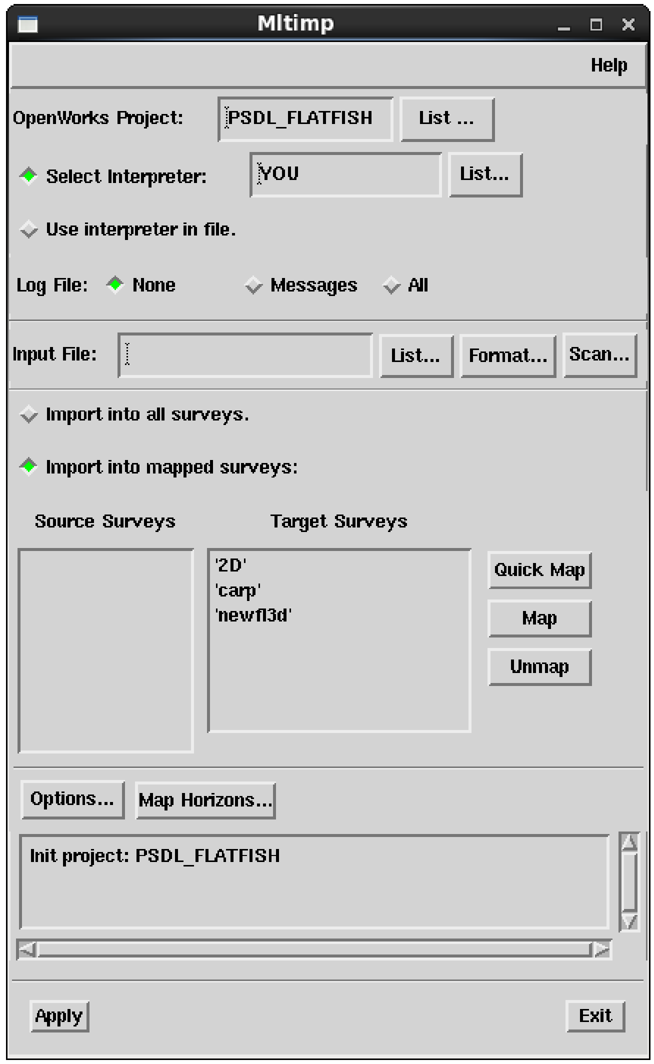
In this exercise, you will import a horizon file using Mltimp. The file to import is EXAMPLE_unconf.xyz. This file is Legacy file, so the workflow will be slightly different than the horizon imported in Chapter 6.

1. If the PSDL_FLATFISH project database is not your selected OpenWorks project, select it now using Project Status Tool, and set your Interpreter ID.

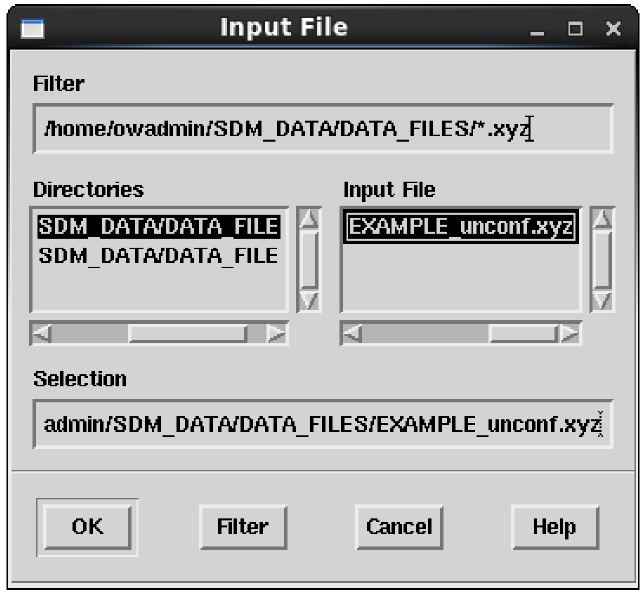
2. Open Seismic Tools (from the OpenWorks command menu select **Data** > **Management** > **Seismic Tools**) and select **Horizons** > **Import**.



3. In the *Mltimp* dialog, click **List…** to select **PSDL_FLATFISH** for the OpenWorks project. The horizon will be imported into this project.



4. For the Input File, click **List…** to select *EXAMPLE_unconf.xyz*.

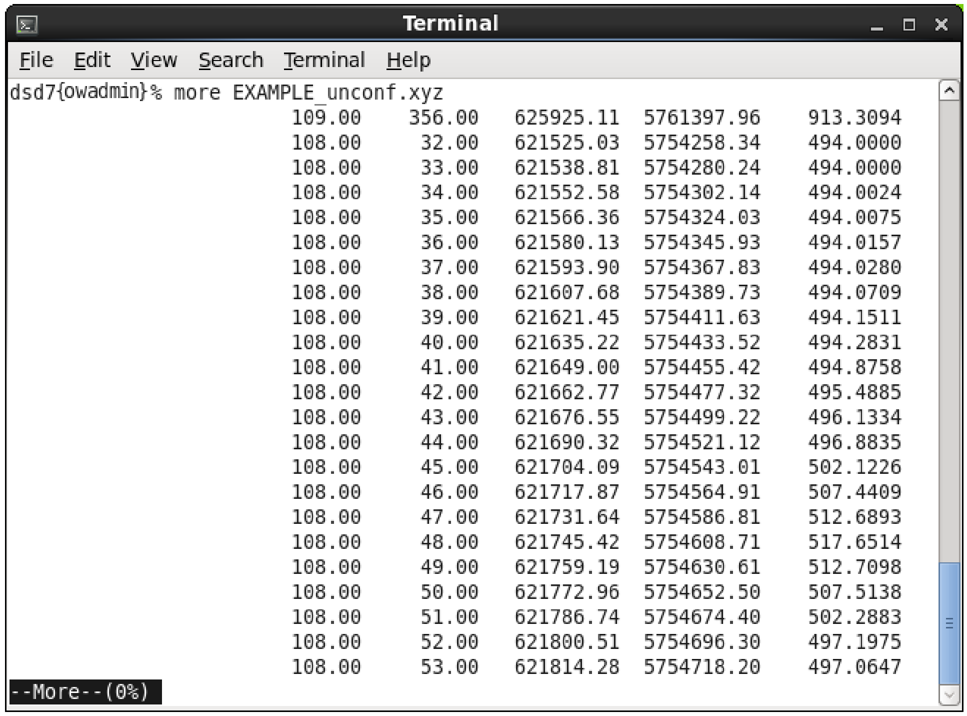


Note that the file extension is not the expected *.dat*, so you will need to change *.dat to just * or *.xyz in the *Filter* path.

Because the file is not the standard Mlt format, a message dialog appears indicating the file is a Legacy file. Legacy formats are offered for third- party applications that cannot read Mlt formats.

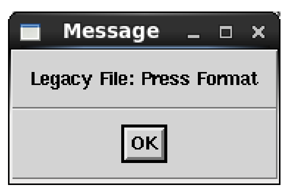
You can view this ASCII file in a terminal window. Navigate to the directory where the file resides and type:

```
more EXAMPLE_unconf.xyz
```



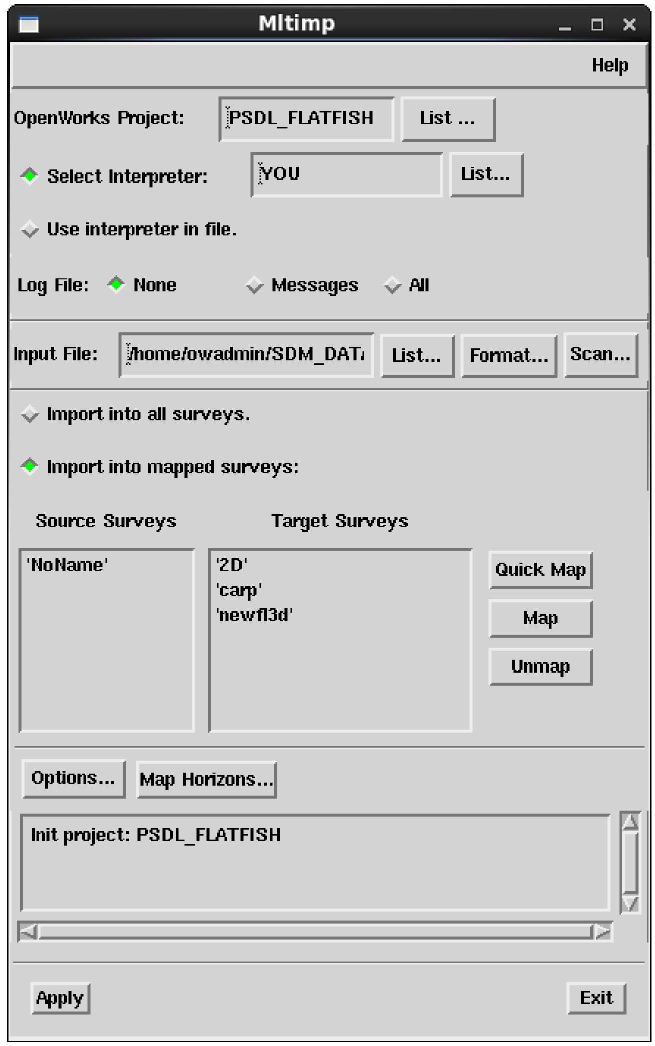
```
dsd7{owadmin}% more EXAMPLE_unconf.xyz
                          109.00    356.00   625925.11  5761397.96    913.3094
                          108.00     32.00   621525.03  5754258.34    494.0000
                          108.00     33.00   621538.81  5754280.24    494.0000
                          108.00     34.00   621552.58  5754302.14    494.0024
                          108.00     35.00   621566.36  5754324.03    494.0075
                          108.00     36.00   621580.13  5754345.93    494.0157
                          108.00     37.00   621593.90  5754367.83    494.0280
                          108.00     38.00   621607.68  5754389.73    494.0709
                          108.00     39.00   621621.45  5754411.63    494.1511
                          108.00     40.00   621635.22  5754433.52    494.2831
                          108.00     41.00   621649.00  5754455.42    494.8758
                          108.00     42.00   621662.77  5754477.32    495.4885
                          108.00     43.00   621676.55  5754499.22    496.1334
                          108.00     44.00   621690.32  5754521.12    496.8835
                          108.00     45.00   621704.09  5754543.01    502.1226
                          108.00     46.00   621717.87  5754564.91    507.4409
                          108.00     47.00   621731.64  5754586.81    512.6893
                          108.00     48.00   621745.42  5754608.71    517.6514
                          108.00     49.00   621759.19  5754630.61    512.7098
                          108.00     50.00   621772.96  5754652.50    507.5138
                          108.00     51.00   621786.74  5754674.40    502.2883
                          108.00     52.00   621800.51  5754696.30    497.1975
                          108.00     53.00   621814.28  5754718.20    497.0647
--More--(0%)
```


The file contains data with no header information. You will need to tell Mltimp what information is contained in each column of data. You can use the default format if the columns of data in the file match the format expectations. If the file does not match the default format, you must create a custom format in order to correctly import the horizon.



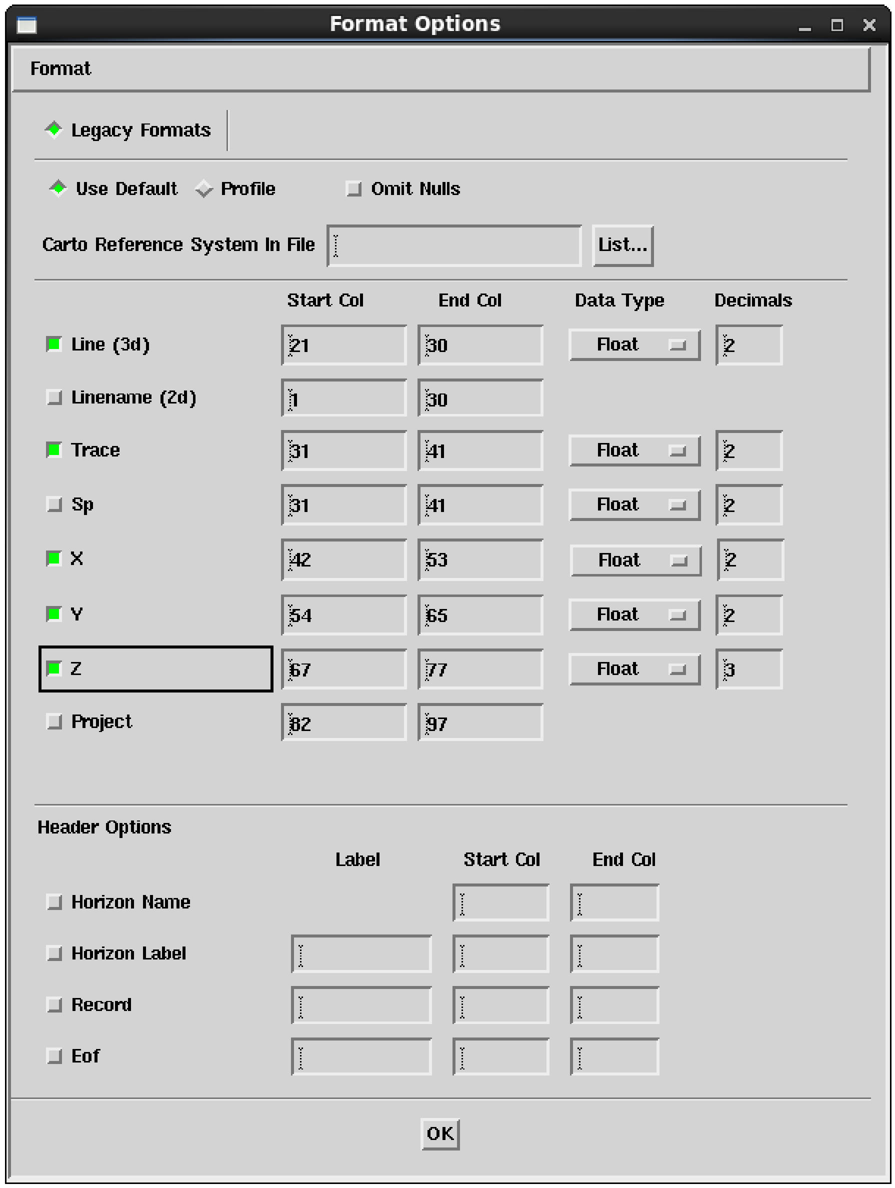
5. Click **OK** in the message dialog to continue.

If the **Input File** you selected in the *Input File* dialog box is in a **Legacy Format**, **NoName** appears in the **Projects in File** panel of the *Mltimp* dialog box (because the **Legacy Format** does not include the survey name).



6. Click **Format…** in the *Mltimp* dialog box. The *Format Options* dialog box appears, and **Legacy Formats** is the only format type available.

7. Select **Use Default**. The format fields are populated with data from the default format file. Toggle **ON** the values in the input file. Click **OK**.



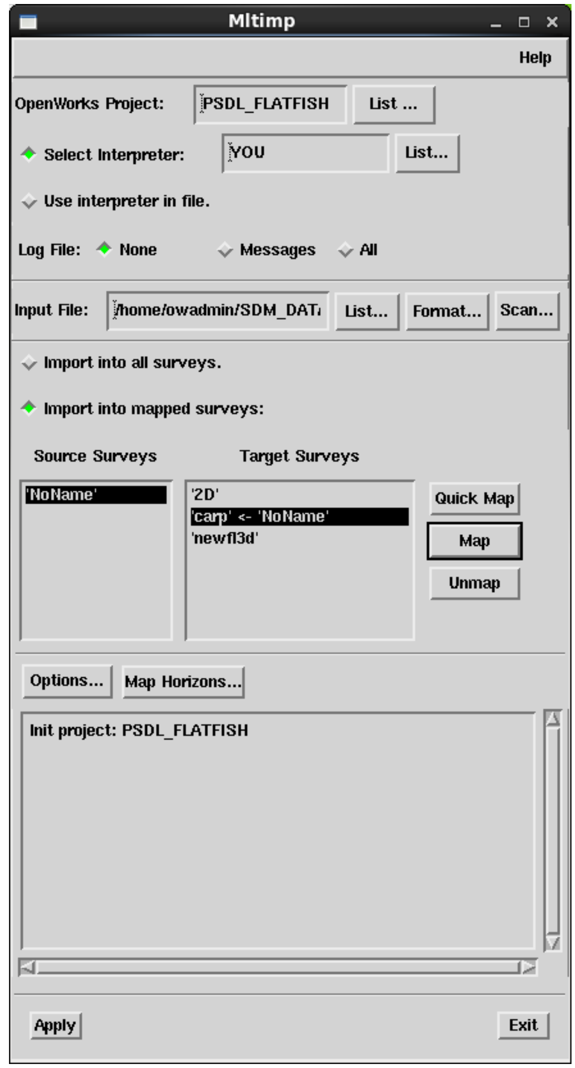
8. To associate the horizons with a survey, highlight both the Source survey **'NoName'** and the **carp** survey in the target survey selection then click **Map**.

Survey Map Options:

Quick Map:
Matches the source survey with the closest name to the target—you don't have to select the survey to use this option

Map:
Highlight the sources survey and the target survey, then click **Map** (you choose the surveys)

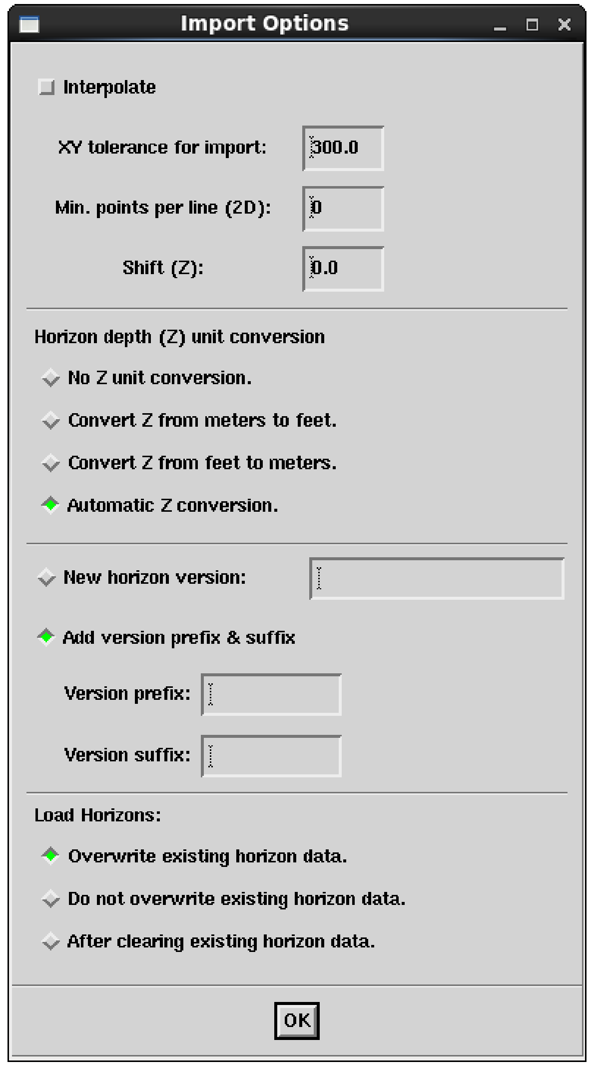
Unmap:
Removes any mapped survey assignments



9. Click **Options…**to see the various import options for this type of file.

Horizon prefixes, suffixes, and Legacy formats

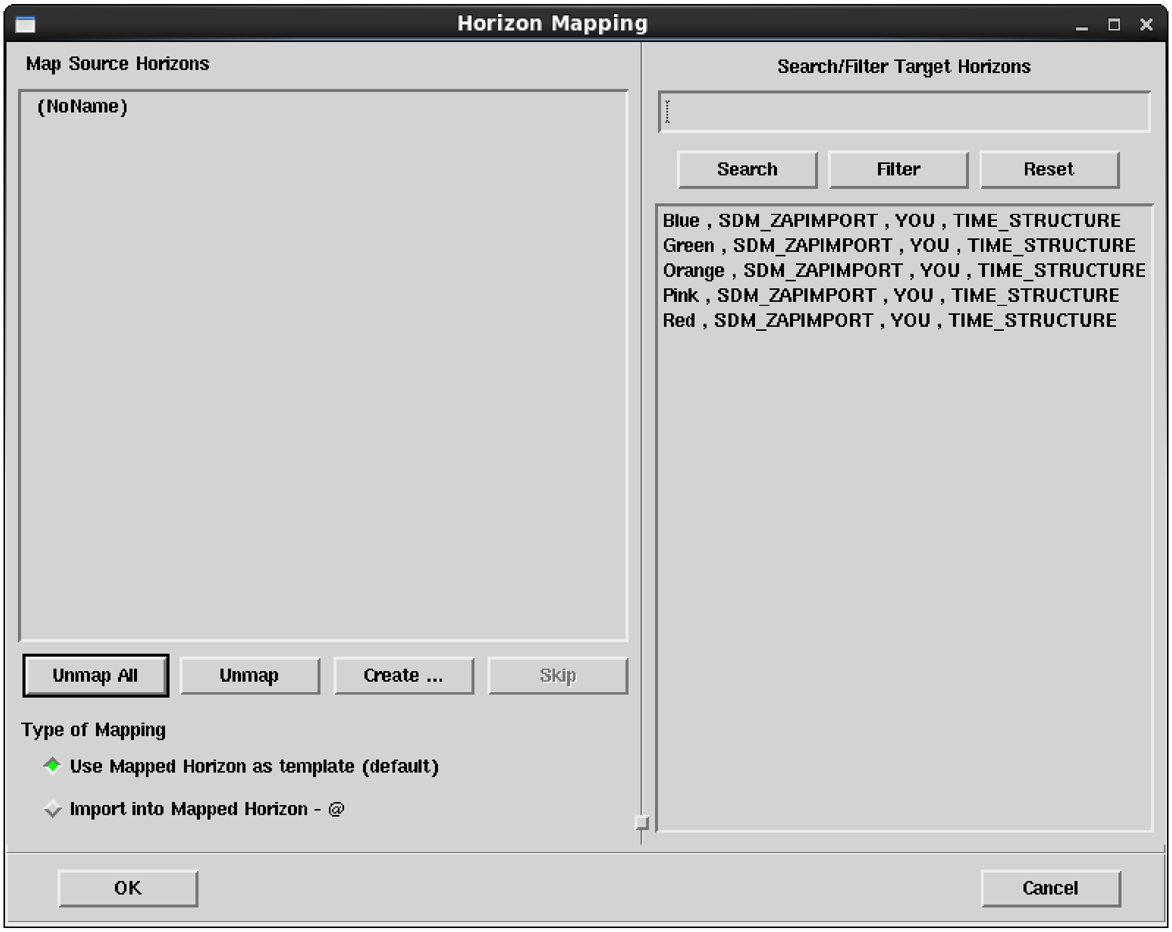
If you import data in Legacy formats, the software ignores Version Prefixes and Version Suffixes if you select an existing horizon or create a new one. Existing horizon data is overwritten and the original version name is retained.



The option choices are explained in a table in the example workflow earlier in this chapter. Let these default for this exercise.

10. Click **OK** to close.

11. Click **Map Horizons…**to associate the horizons from the import file to horizons in the target file.

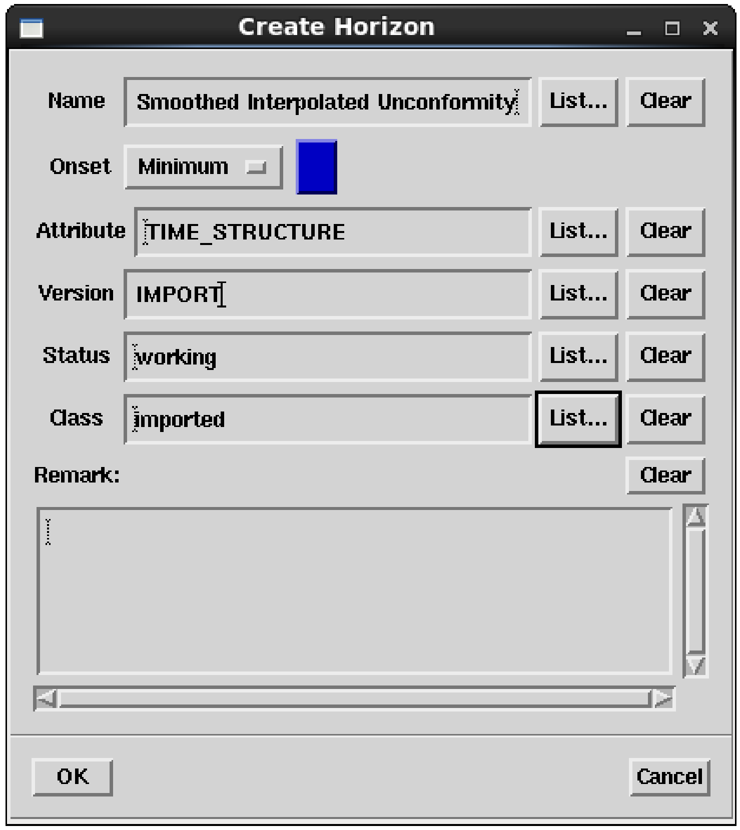


At this point you can map the import horizon to an existing name or you can create a new name for the horizon you want to import.

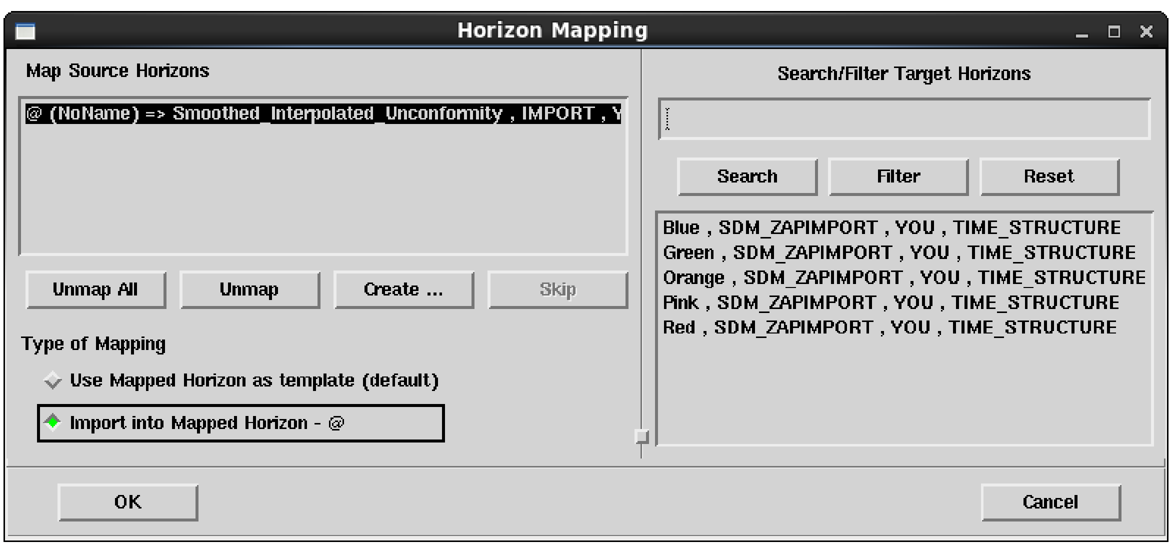
12. Highlight (NoName) in the Map Source Horizons and click **Create** to open the Create Horizon box.

13. Enter **Smoothed Interpolated Unconformity** into the text box. Select **Maximum** for the onset type. Select **blue** for the color.

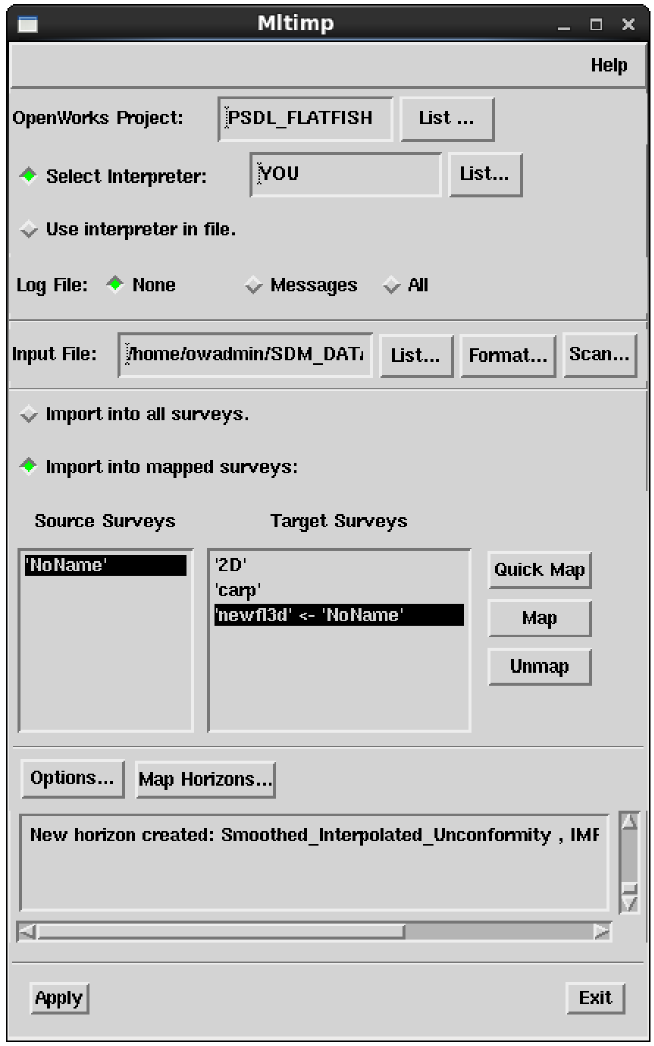
Choose Attribute, Version, Status, and Class selections from the **List…** options.



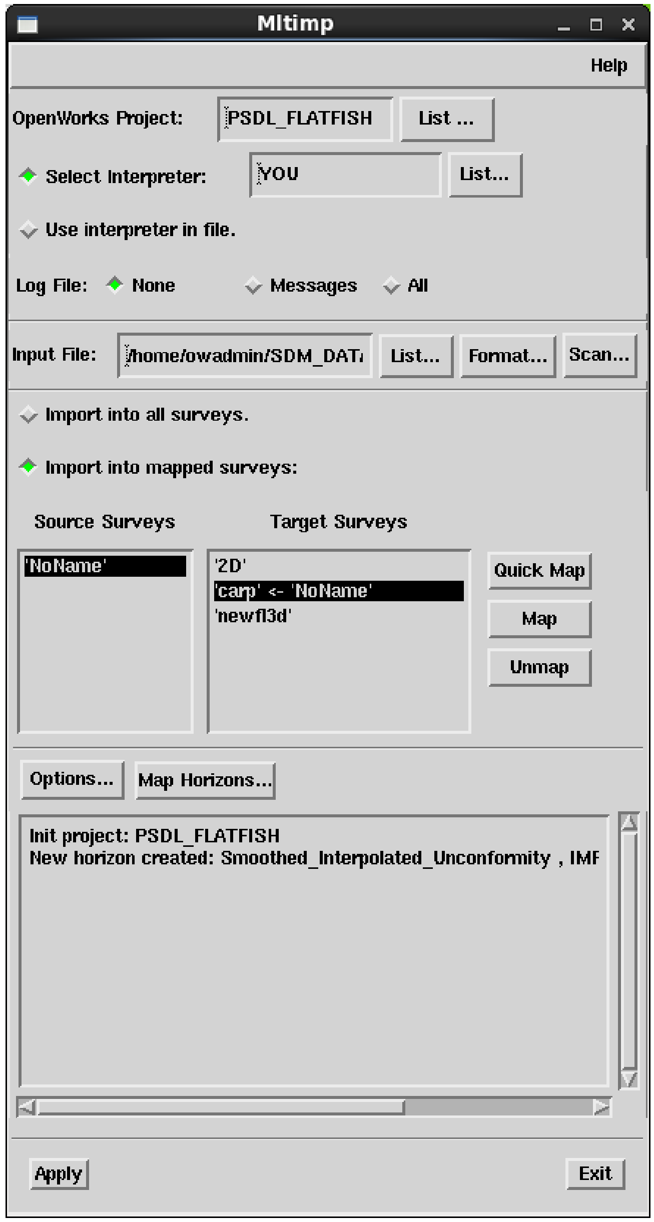
14. Click **OK**.



15. Select *Import into Mapped Horizon @* and click **OK** to close the *Horizon Mapping* dialog box.



16. Click **Apply** at the bottom of the *Mltimp* dialog box.



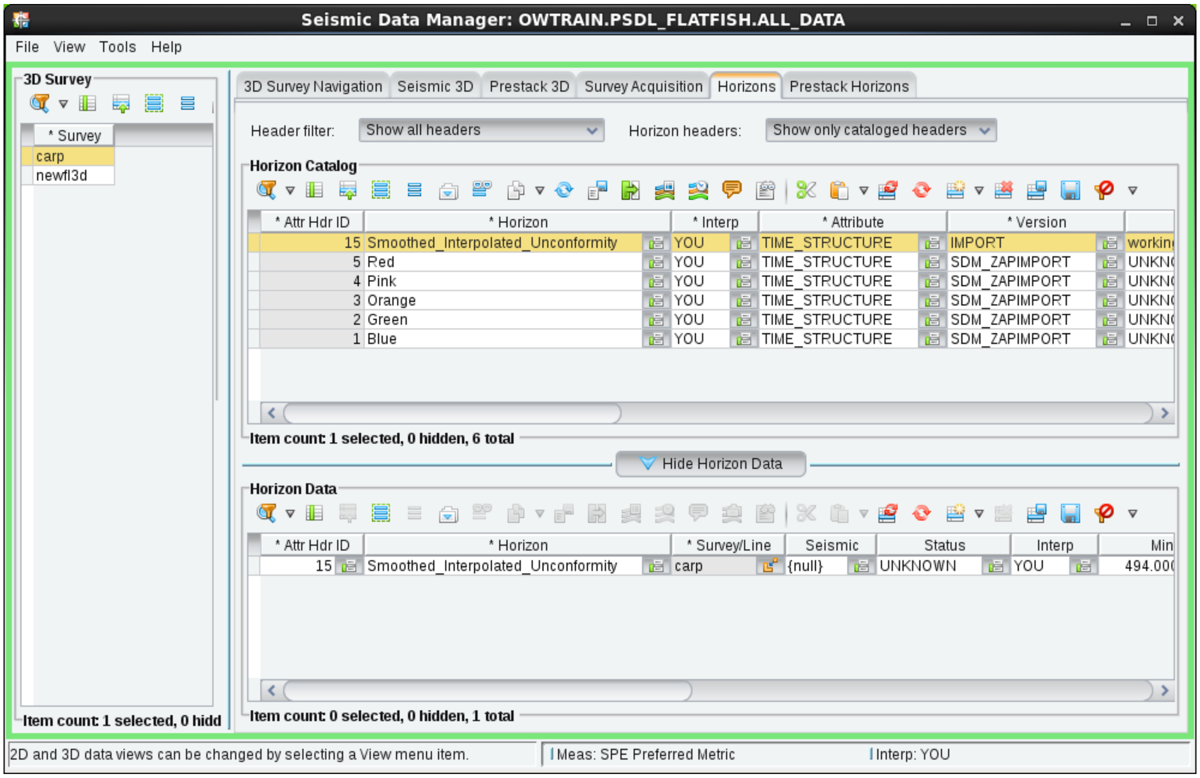
An import summary is listed in the dialog. Scan this report for any errors.

Check the horizons in Seismic Data Manager and take a look at them in SeisWorks Map View or WOW to see what you just imported.

17. Click **Exit** to close Mltimp.

Check the Imported Horizon

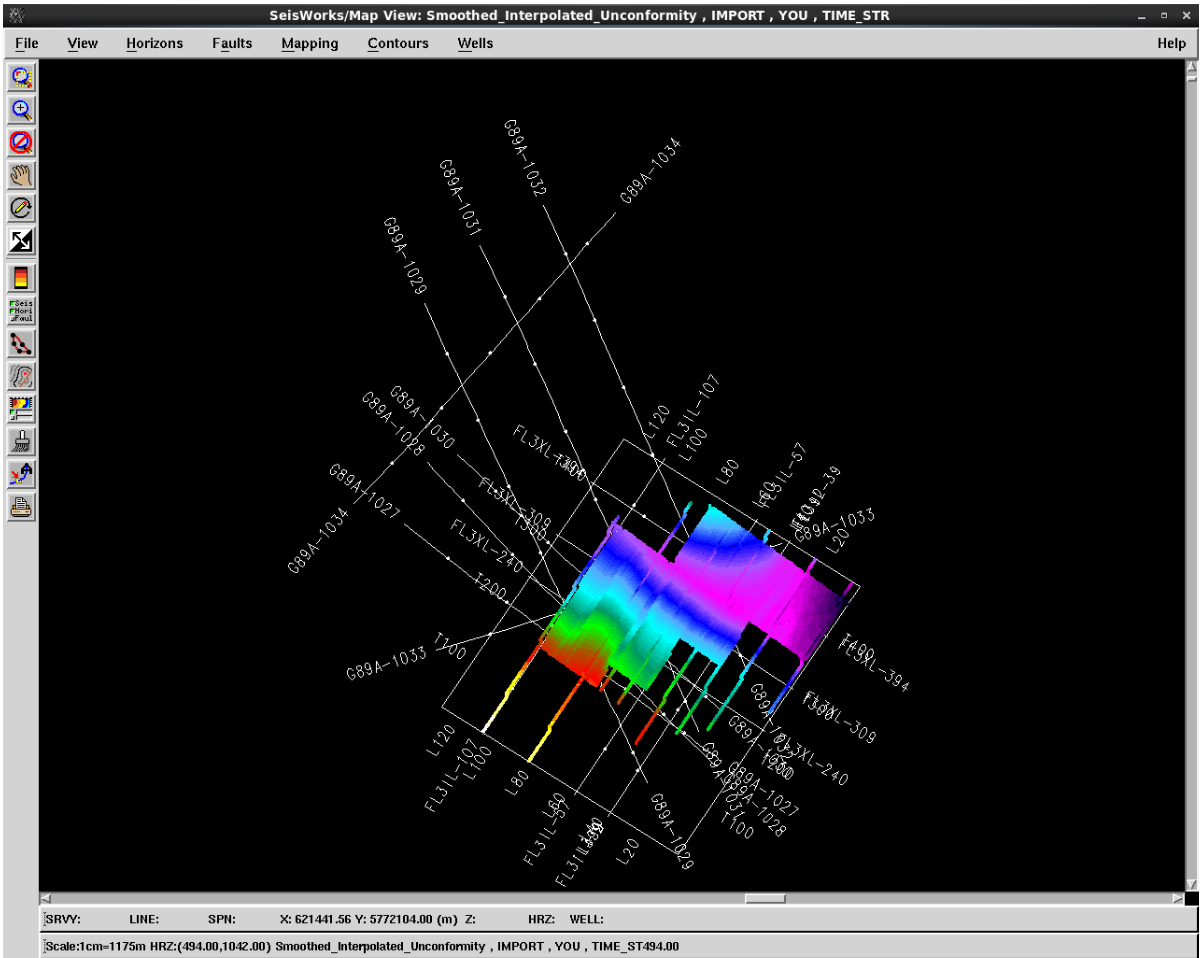
18. Open Seismic Data Manager and select the *newfl3d* 3D survey; click the Horizons tab.



To view the horizons in SeisWorks, in a Map View select the contents icon ().

In the bottom (Horizons) portion of the dialog click **List…** to select the horizon. Make sure it is toggled **ON** and click **Apply**.

Horizon displays in Map View:



EXERCISE 2: Exporting Horizon Data to an ASCII file using a Custom Format File

In this exercise, you will export the horizon you just imported to an ASCII file using a user-defined format file in Mltexp.

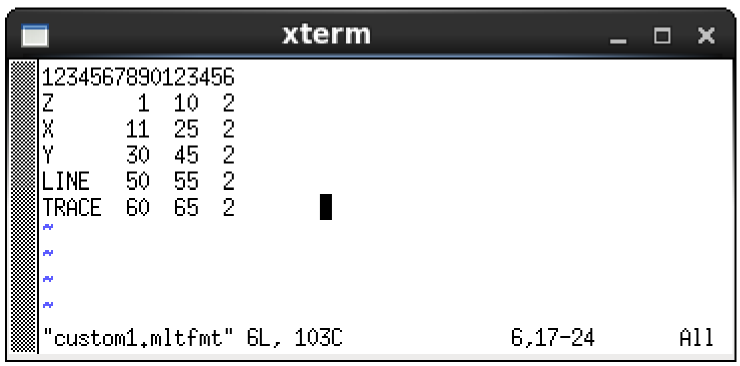
Create the Format File

Format files for use with Mltimp and Mltexp are UNIX files created with a text editor (such as vi or gedit). You can specify the location of the horizon data for an output file to suit your needs.

1. Use a text editor, such as vi, to create a format file called *custom1.mltfmt*, which will output the horizon data in the following format:

Field	**Start column**	**End Column**	**Decimals**
Z	1	10	2
X	11	25	2
Y	30	45	2
LINE	50	55	2
TRACE	60	65	2

Your file should look like the one shown here:



2. From the Seismic Tools select **Horizons > Export**.

3. Click **List…** next to the OpenWorks Project field. Select the *PSDL_FLATFISH* project and click **OK**.

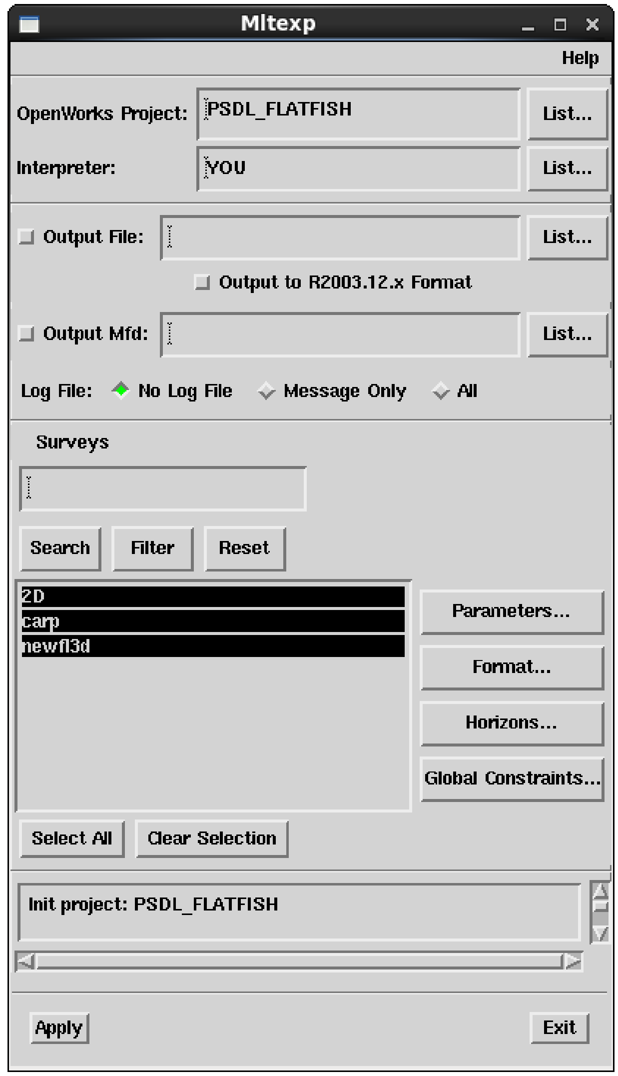
   - The survey or surveys that are part of the OpenWorks project appear highlighted in the middle left panel.

   - The associated interpretation ID appears in the **Interpreter** field.

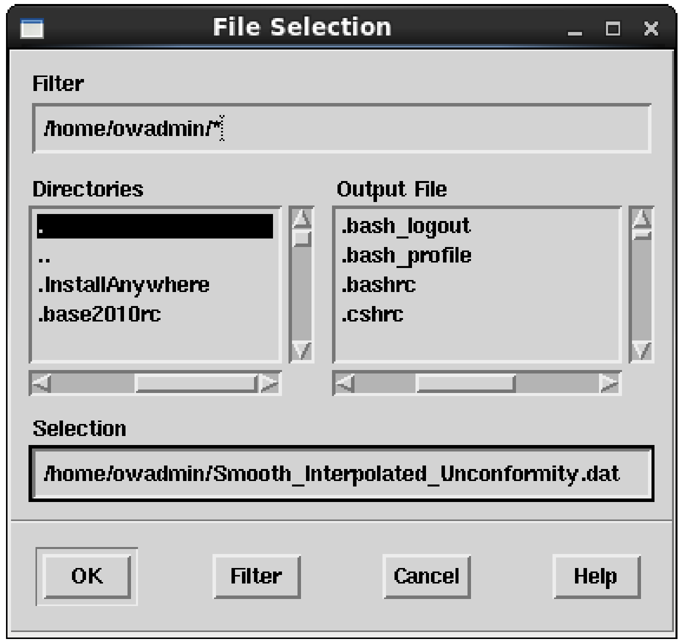
- Information in the bottom panel tells you that the project you chose has been initialized.

You can now choose an **Output File**, and **Output Mfd**, or both.

An **Mfd** file is a Z-MAP Plus file that manages data types such as control points, grids, faults, and lineal features.



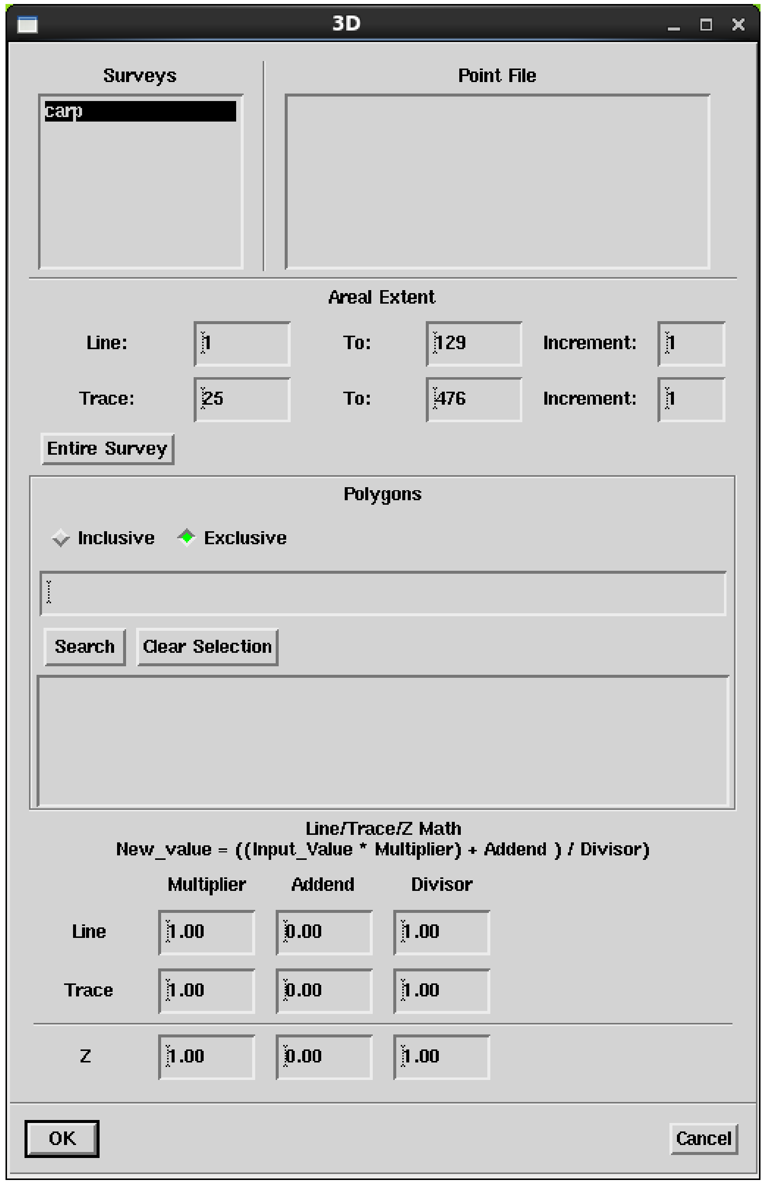
4. Select the **Output File** check box and click the **List...** button. The File Selection browser window appears.



5. Type `Smoothed_Interpolated_Unconformity.dat` in the **Selection** field. Click **OK**.

   This procedure specifies *Smoothed_Interpolated_Unconformity.dat* as the name for the ASCII file to which the data is to be exported.

6. Highlight *carp* in the **Selected Surveys** panel and click **Parameters…**



For this exercise, you will default the parameters options and resume with Step 7, though the parameters options are briefly explained below.

There are two versions of the parameters dialog box, depending on whether you are working with 2D lines or 3D surveys.

Parameter options allow you to:

- Apply shifts (2D)
- Choose specific 2D lines to export
- Limit areal extent (3D)

- Limit the horizon data you export by using polygon sets

  By default, the **Exclusive** radio button is toggled on in the **Polygons** panel. You can also toggle on **Inclusive**. These choices, however, are significant only if you select a mapping file (.dts) from the panel below the search field.

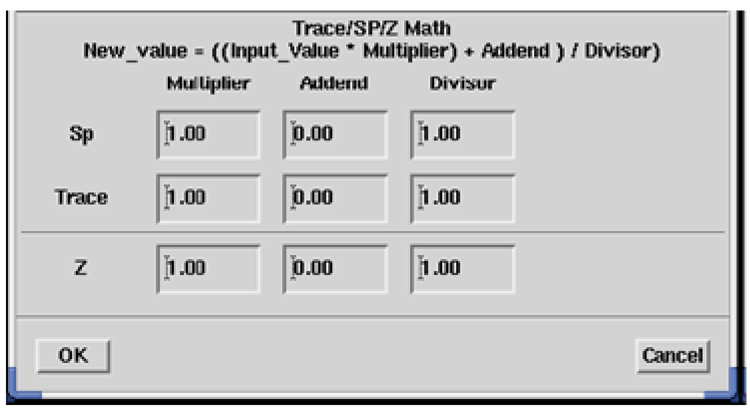
  — Each mapping file contains a set of polygons. If you want to use all the data *inside* the polygon, toggle on **Inclusive**.

  — If you want to use all the data *outside* the polygon, toggle on **Exclusive**.

- Renumber lines and traces and shift horizons before export (**Trace/SP/Z Math**)

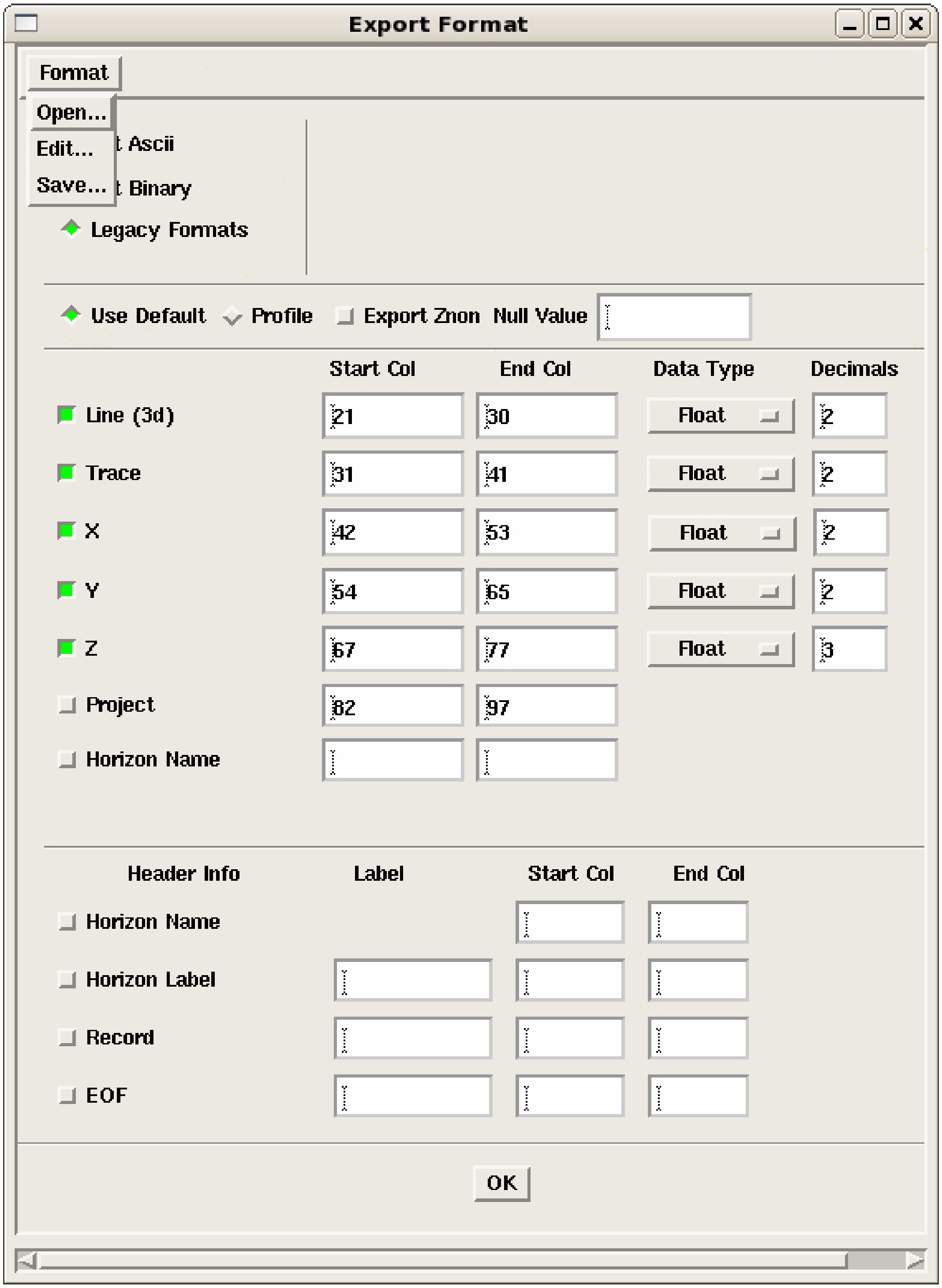
  This functionality allows you to better align data in the project to which you are exporting the data.

  The equation is:
  New Value = ((Input_Value * Multiplier) + Addend) / Divisor)

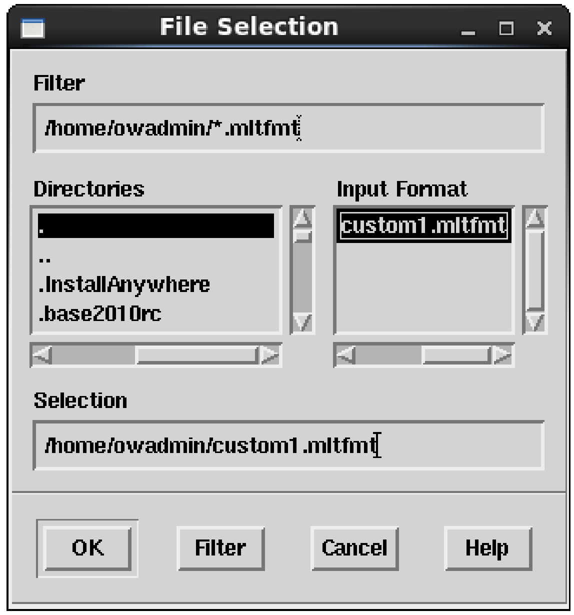


7. Click **OK** to accept the default settings.

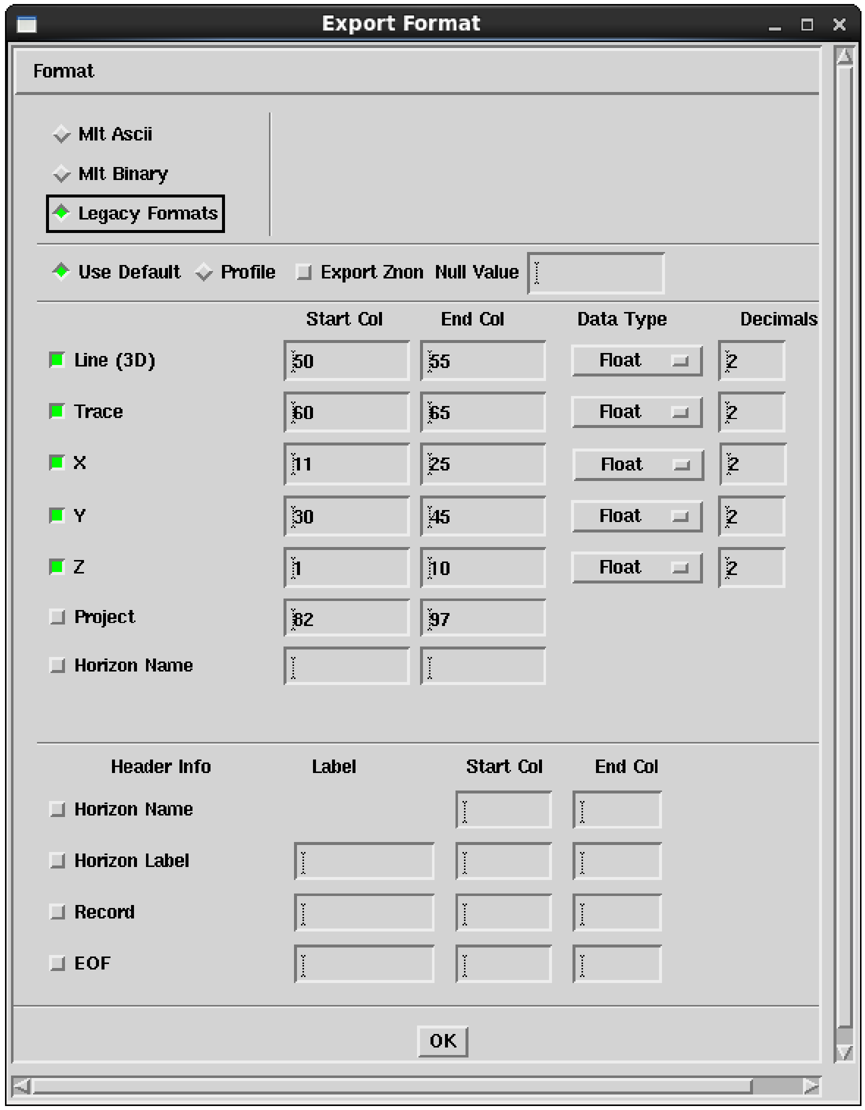
8. Click **Format…**.



9. Select **Legacy Formats**, and the *Format Options* dialog box expands. Select **Format > Open** and browse to *custom1.mltfmt*, the format file you created at the beginning of the exercise.



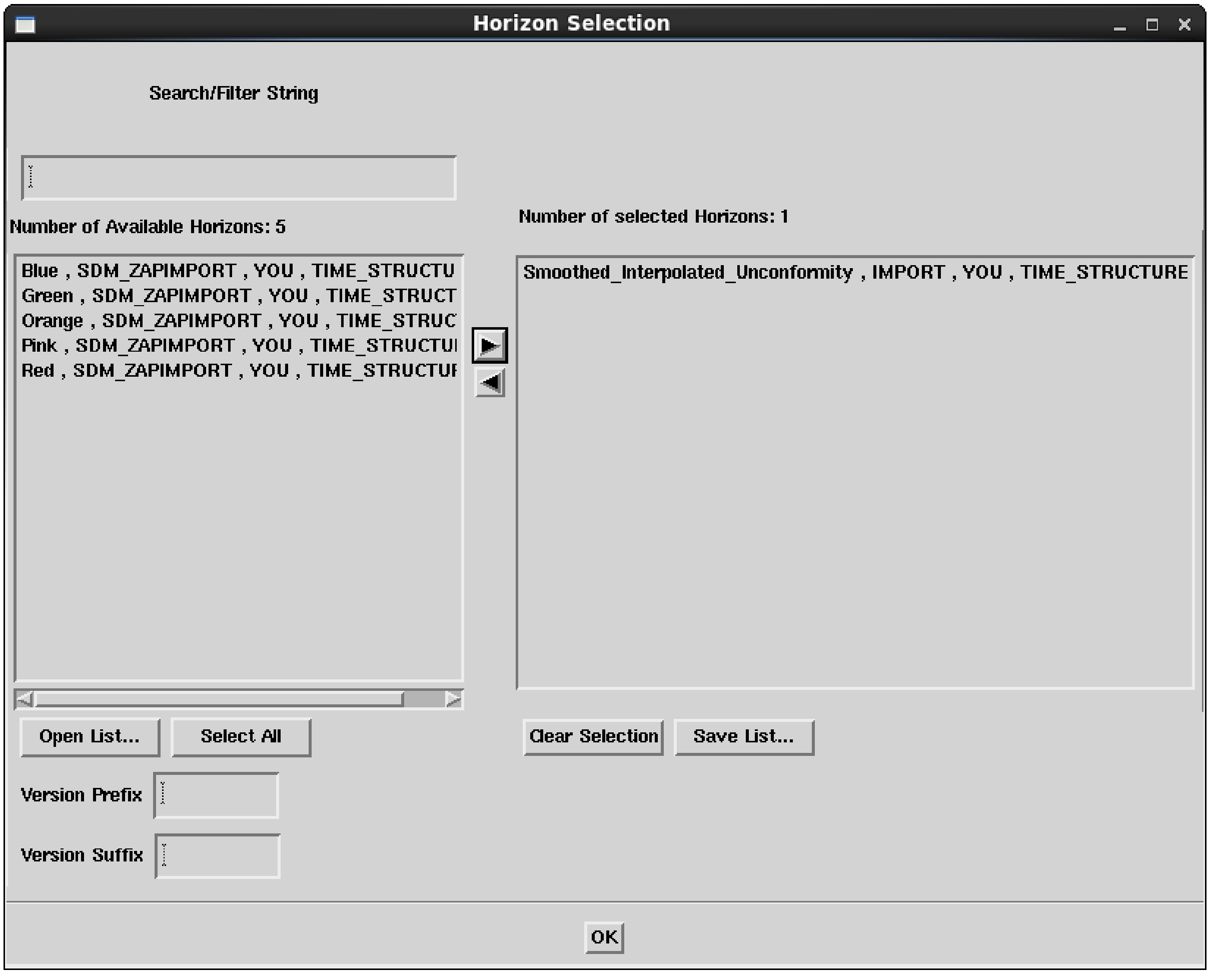
10. Click **OK**. The format fields are populated with data from the *custom1.mltfmt* file.



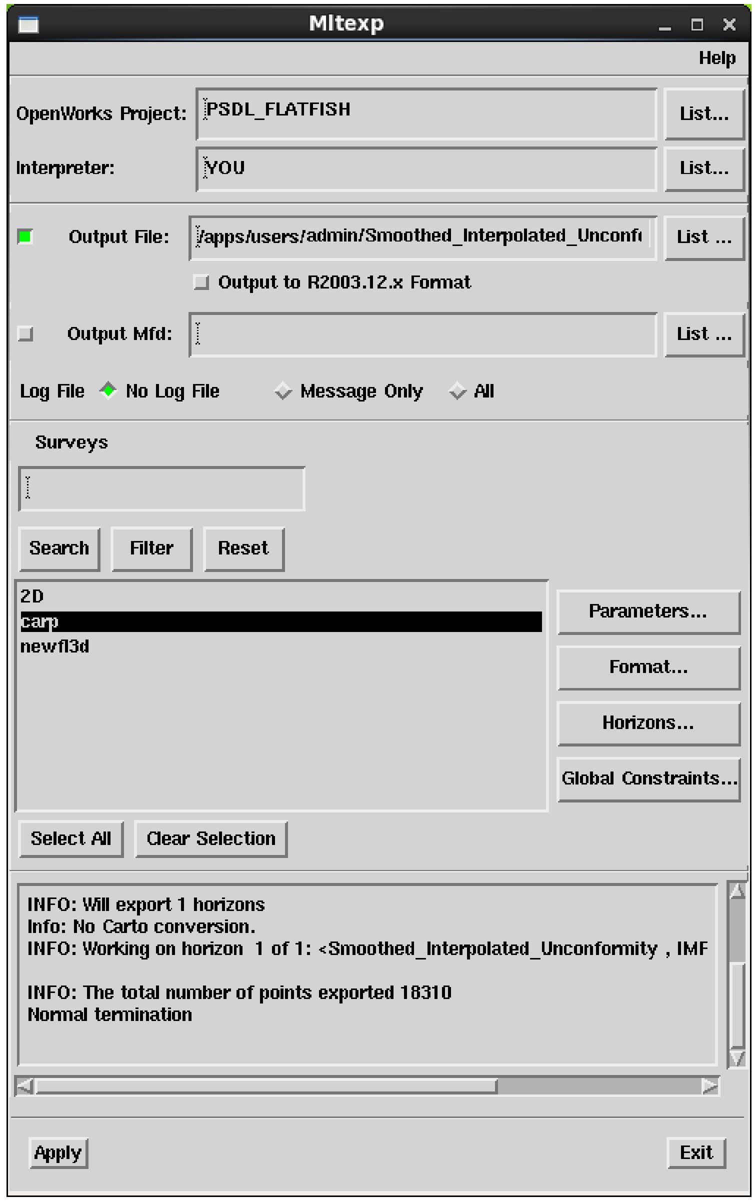
11. Click **OK** in the *Format Options* dialog box.

12. Click **Horizons…** in the *Mltexp* dialog box.

13. To select the horizon to export, highlight the Smoothed_Interpolated_Unconformity horizon in the available list and click the arrow to move it to the selected list.



14. Click **OK**.



15. In the *Mltexp* dialog box, click **Apply**.

    A progress bar appears, showing the horizons that are being exported and the percentage of the job completed. In addition, names of the horizons and information about the export appear in the bottom of the *Mltexp* dialog box as they are exported.

16. Click **Exit** in the *Mltexp* dialog box.

17. Check the export in a terminal window:

- Navigate to the location you selected for the horizon file
- Enter **more Smoothed_Interpolated_Unconformity.dat**

```
Terminal
File  Edit  View  Search  Terminal  Help
dsd7{owadmin}% more Smoothed_Interpolated_Unconformity.dat
   1028.30      633932.29          5758613.34      1.00    447.00
   1042.00      633869.52          5758652.58      2.00    447.00
    829.84      631242.19          5754908.88      3.00    260.00
    820.20      631255.91          5754929.11      3.00    261.00
    811.12      631269.62          5754949.34      3.00    262.00
    820.76      631283.34          5754969.57      3.00    263.00
    830.41      631297.05          5754989.80      3.00    264.00
    830.28      631310.76          5755010.03      3.00    265.00
    830.37      631324.48          5755030.26      3.00    266.00
    831.25      631338.19          5755050.49      3.00    267.00
    831.69      631351.91          5755070.72      3.00    268.00
    832.21      631379.34          5755111.18      3.00    270.00
    833.62      631393.05          5755131.41      3.00    271.00
    830.17      631406.76          5755151.64      3.00    272.00
    829.88      631420.48          5755171.87      3.00    273.00
    830.01      631434.19          5755192.10      3.00    274.00
    833.01      631447.91          5755212.33      3.00    275.00
    832.89      631461.62          5755232.55      3.00    276.00
    833.18      631475.34          5755252.78      3.00    277.00
    837.93      631489.05          5755273.01      3.00    278.00
    834.48      631502.76          5755293.24      3.00    279.00
    830.96      631516.48          5755313.47      3.00    280.00
    831.60      631530.19          5755333.70      3.00    281.00
    832.10      631543.91          5755353.93      3.00    282.00
    832.62      631557.62          5755374.16      3.00    283.00
    833.45      631571.34          5755394.39      3.00    284.00
    834.60      631585.05          5755414.62      3.00    285.00
    835.41      631598.76          5755434.85      3.00    286.00
    836.38      631626.19          5755475.31      3.00    288.00
    837.43      631639.91          5755495.54      3.00    289.00
--More--(0%)
```

Use the Legacy option when you need to customize the output file. Compare the customized file with the file below which was created using the Mlt ASCII (Line and Trace) output option.

Terminal

File Edit View Terminal Tabs Help

```
trn01{student}% more Smoothed_Interpolated_Unconformity_Default.dat
@File_Version: 4
@Coordinate_Type_is: 0
@Export_Type_is: 1
@Number_of_Projects 3
@Project_Type_Name: , 2,2D, 3,carp, 3,newfl3d,
@Project_Unit_is: meters , UTM 55S Meters , PROJECTED_COORDINATE_SYSTEM
#File_Version____________-> 4
#Project_Name____________-> newfl3d
#Project_Type____________-> 3
#Export_XY_Unit__________-> meters
#OpenWorks_Project_______-> 'PSDL_FLATFISH'
#Master_Project_______->
#Coordinate_type_________-> 0
#Number_of_points_in_hzd_-> 1
#Horizon_internal_id_____-> 87
#Horizon_extremes_are____-> 494.00000  1042.00073
#Horizon_onset_is_Maximum_____-> 3
#Horizon_type_is_TIME_STRUCTURE______-> 1
#Horizon_color_is________-> 0 144 254
#Horizon_name____________-> Smoothed_Interpolted_Unconfromity
#Horizon_attribute_______-> TIME_STRUCTURE
#Horizon_version_________-> IMPORT
#Horizon_interp_status___-> working
#Horizon_class___________-> imported
#Export_Z_Unit___________-> ms
#Horizon_onset_type______-> Maximum
#Horizon_data_domain_____-> TIME
#Horizon_remark_size_____-> 0

#End_of_Horizon_ASCII_Header_
    1.0   447.0   1028.29724
    2.0   447.0   1042.00073
    3.0   260.0    829.83618
    3.0   261.0    820.19641
    3.0   262.0    811.11542
    3.0   263.0    820.76312
    3.0   264.0    830.41357
    3.0   265.0    830.28442
    3.0   266.0    830.37299
    3.0   267.0    831.24658
    3.0   268.0    831.68848
    3.0   270.0    832.21332
    3.0   271.0    833.61658
    3.0   272.0    830.17047
    3.0   273.0    829.88232
    3.0   274.0    830.00677
    3.0   275.0    833.00568
    3.0   276.0    832.89032
    3.0   277.0    833.18127
    3.0   278.0    837.93158
--More--(0%)
```

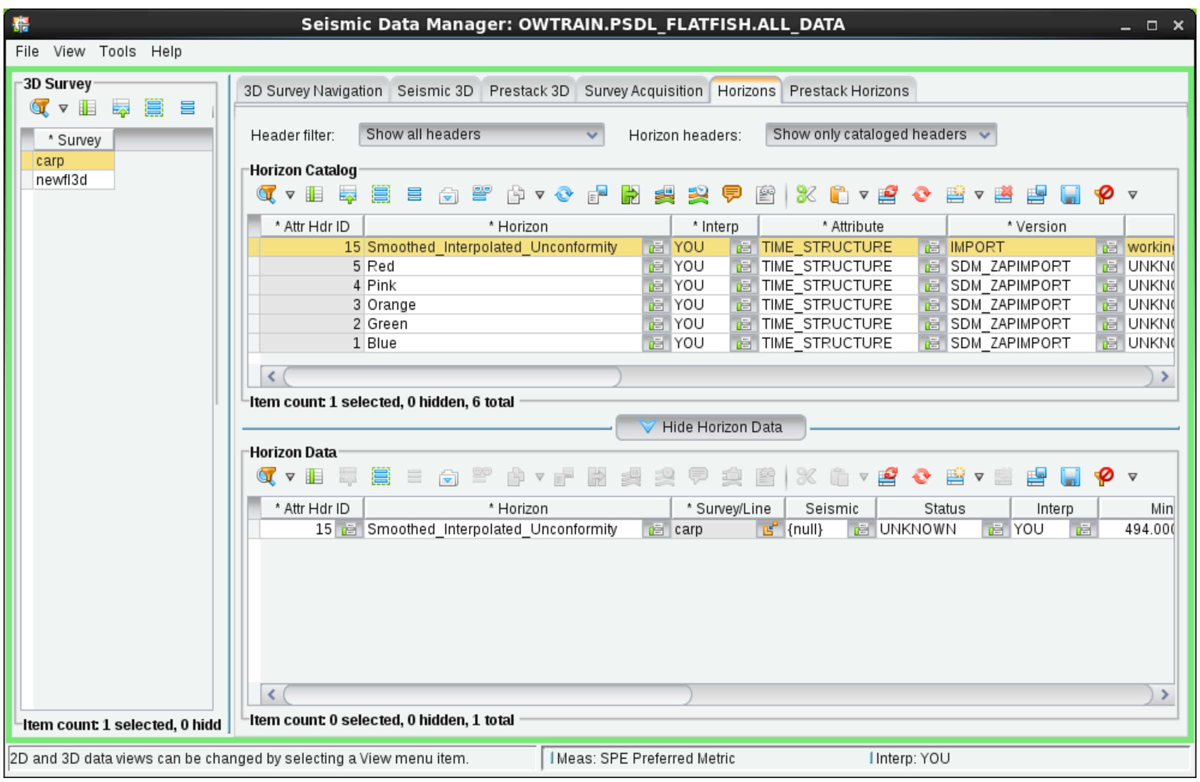
EXERCISE 3: Changing a Horizon Name

In this exercise, you will change the name of one of the horizons you imported. Horizon names are changed in Seismic Data Manager. You can change the name of a horizon by selecting an existing horizon name (when you have two horizons that really should be the same), or create an entirely new name for the horizon.

For the exercise, you will change the *Smoothed Interpolated Uncomformity* horizon to the new horizon name ***New Smoothed Interpolated Uncinformity***.

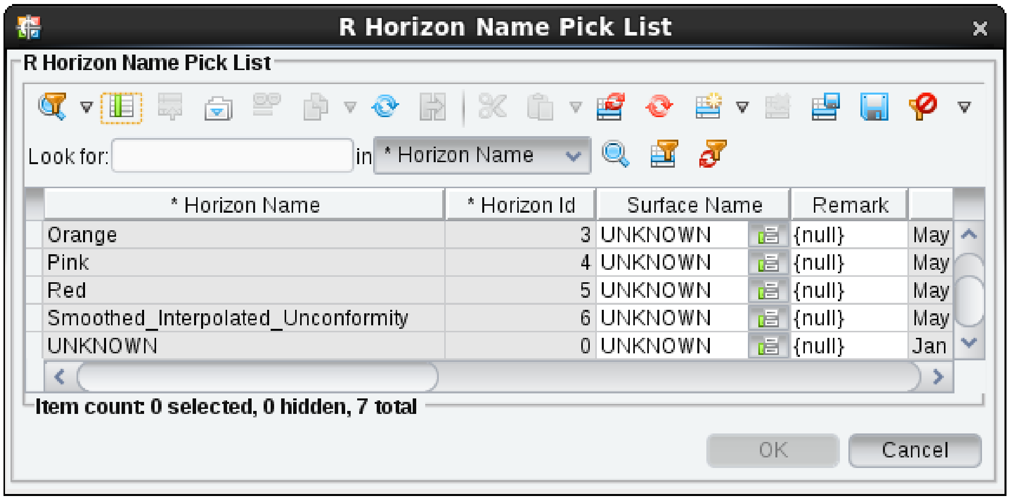
1. Open Seismic Data Manager from either the OpenWorks command menu (**Data > Management > Seismic Data Manager**) or if you have Seismic Tools open, you can select **Seismic > Seismic Data Manager**.

2. Highlight the *Smoothed Interpolated Unconformity* horizon in the Horizon catalog.



3. Click the icon button () in the *Smoothed Interpolated Uncomformity* horizon name field (see arrow).

This icon will open the *R Horizon Name Pick List* dialog.



If the name you want to change horizon *Smoothed Interpolated Uncomformity* to exist in this list, highlight the new name and click **OK**.

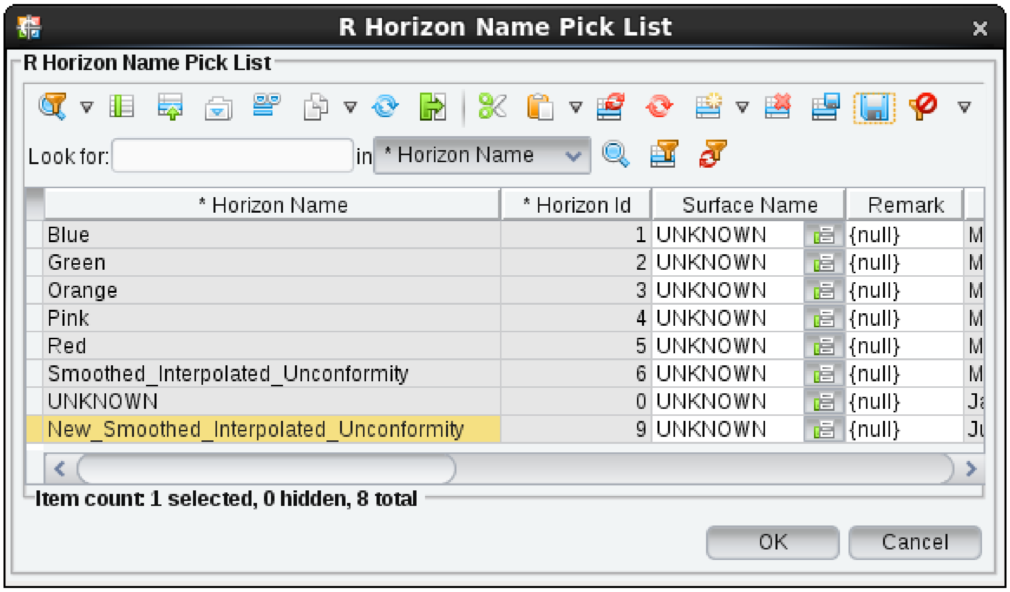
Since *New_Smoothed Interpolated Uncomformity* does not exist in the list, you must first define the name as a valid horizon name.

4. Click the Add new R Horizon Name icon ( ).

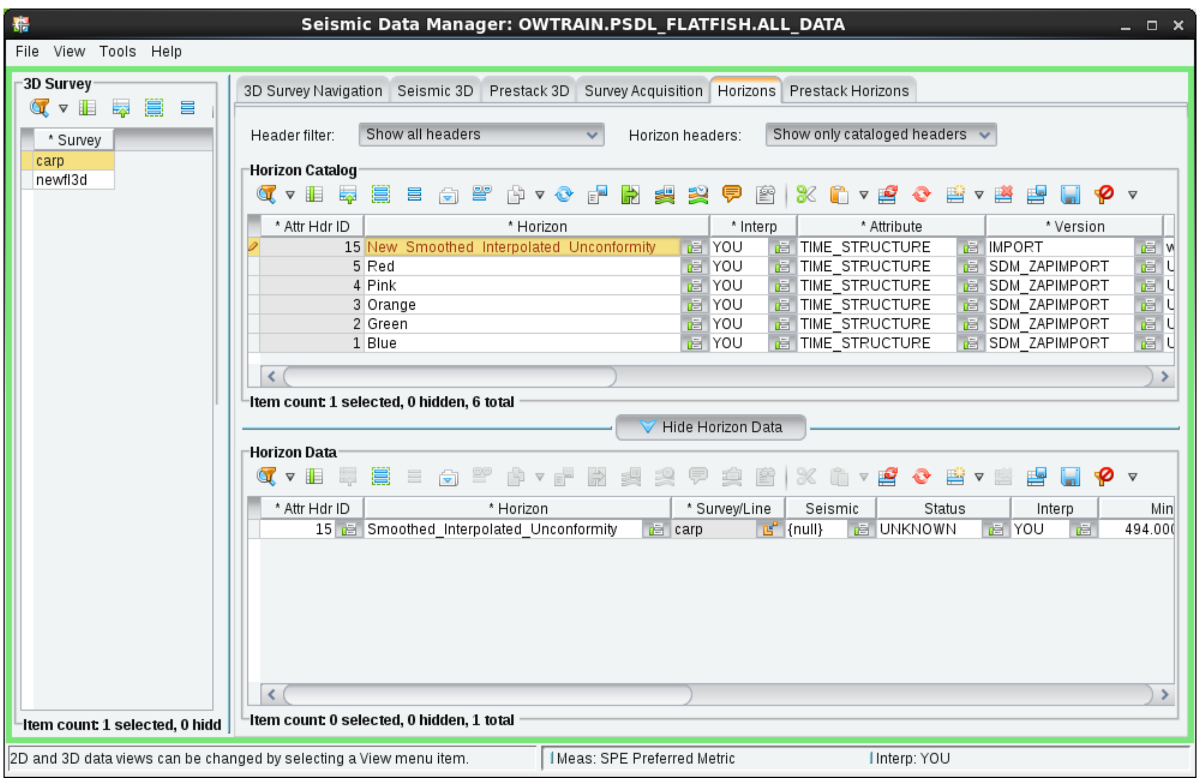
   A blank line appears in the horizon name list.

5. Type *New_Smoothed Interpolated Uncomformity* in the Horizon Name field and press **<*Enter*>** on your keyboard.

6. Click the *Save row* icon ( ). The name has been added to the database as a valid horzion name.



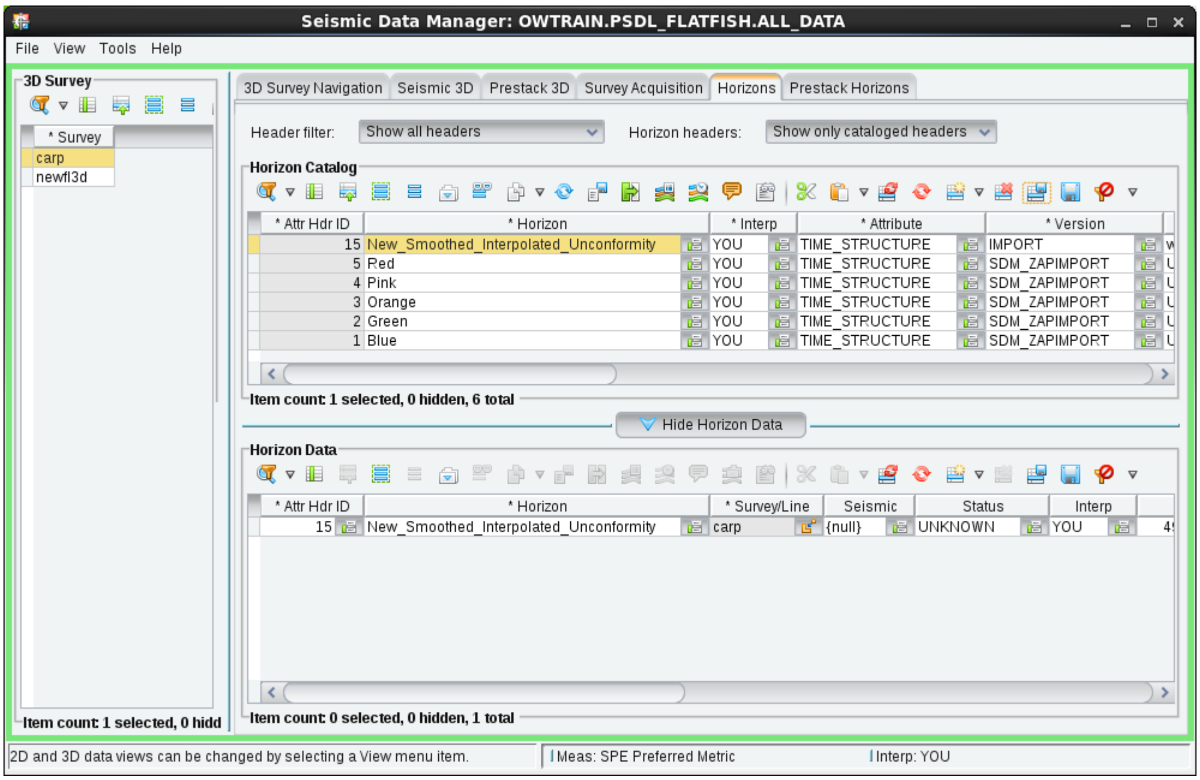
7. Click **OK** in this dialog box to change the horizon name.



8. In the Seismic Data Manager main window, the *Smoothed_Interpolated_Uncomformity* horizon changes to

New_Smoothed_Interpolated_Uncomformity. The orange name color indicates that the change has not yet been saved to the database.

9. Click the *Save row* icon () in this window to complete the name change.



The *Smoothed_Interpolated_Uncomformity* horizon name and data have been changed to *New_Smoothed_Interpolated_Uncomformity* in the database.

Managing Fault Data

In this section, you will learn about:

- Fault Data Manager Utility
- Importing and exporting fault data using:
  - Fault > Import and Fault > Export (Seismic Tools/Command Line Utilities)
  - Data Import/Export

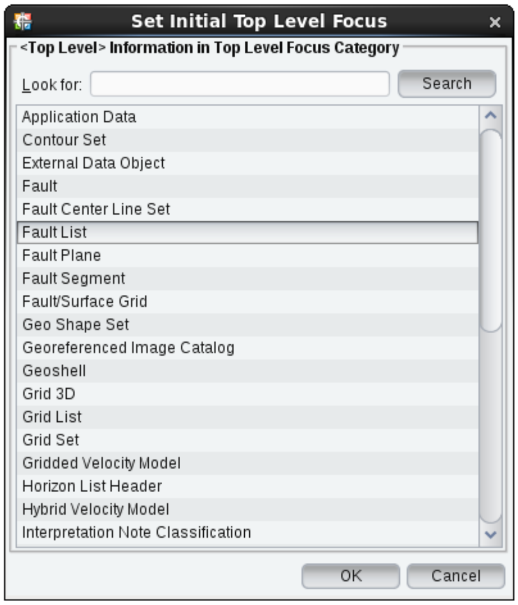
Fault data is stored in the OpenWorks project. Fault set files, which contain lists of faults for interpretation scenarios, are also stored in the database and can be managed through Interpretation Data Manager.

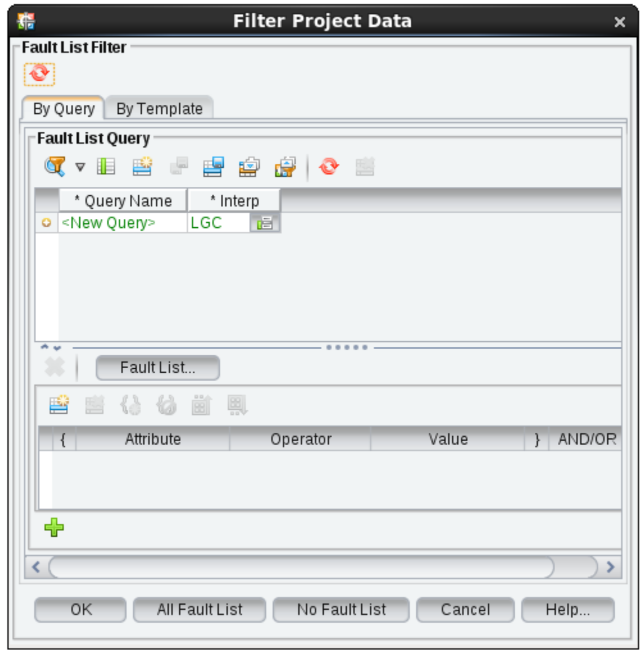
Interpretation Data Manager

To view and manage fault set data, open Interpretation Data Manager by selecting **Data > Management > Interpretation Data Manager** from the OpenWorks command menu.

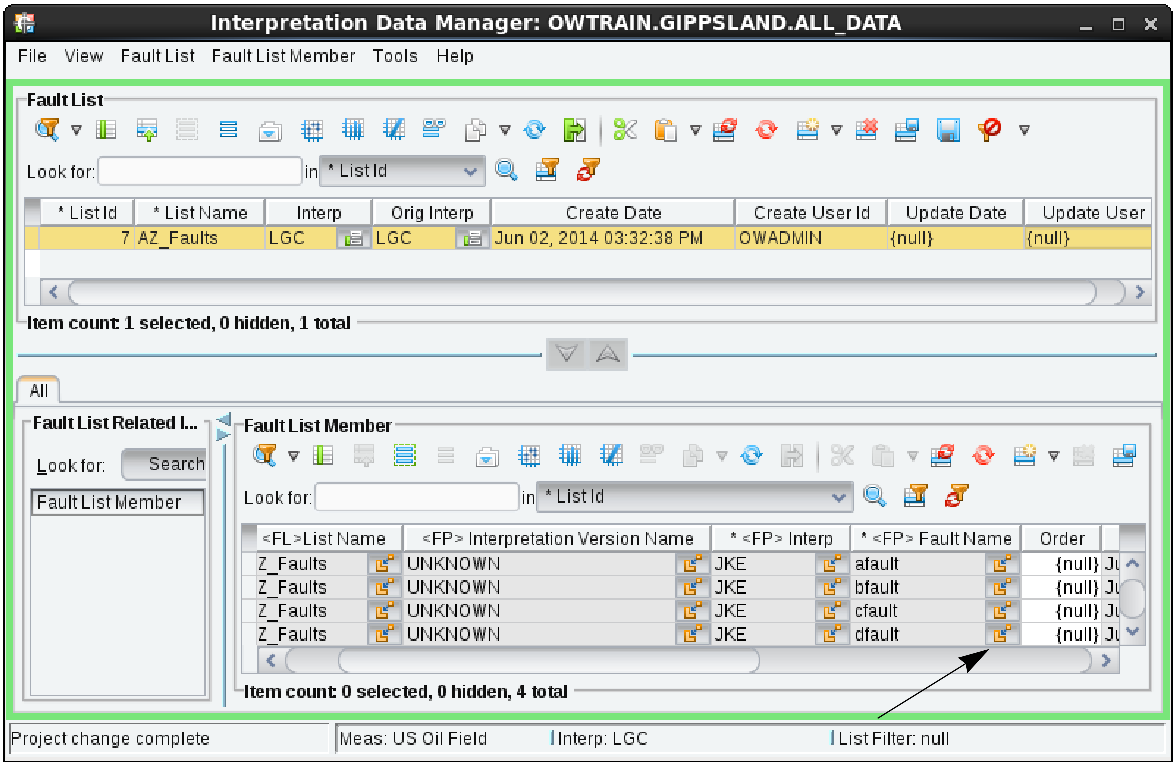
The *Top Level Focus* option allows you to manage the type of data you want to view.

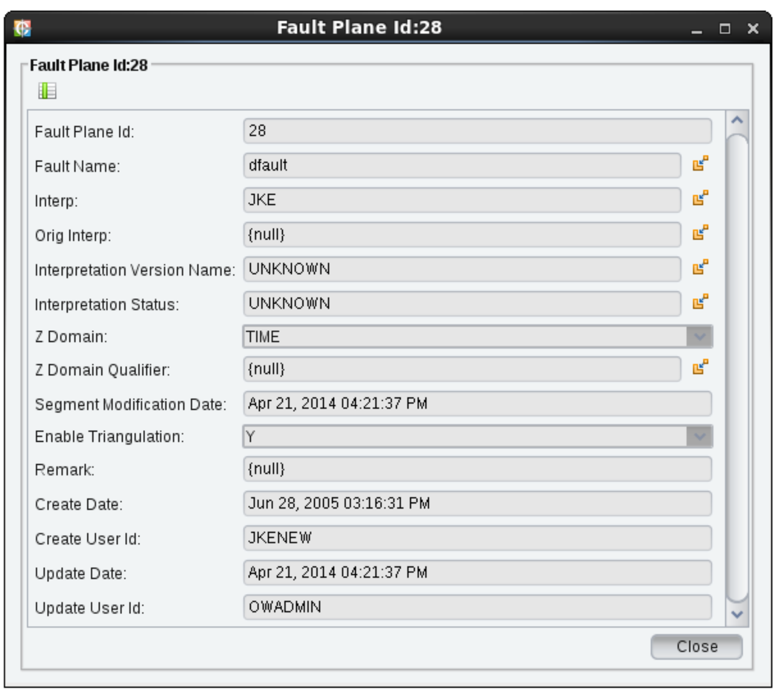
Set the Top Level Focus to *Fault List* for Interpretation Data Manager and filter options (*All Fault List*) to open the manager.





Interpretation Data Manager opens.





Click the icon next to the Fault Name to see the fault name.

Data for SeisWorks faults stored in the OpenWorks database may include:

- control points
- unassigned and assigned fault segments

Several utilities exist for managing fault data:

Fault Data Manager - accessed from the **Seismic Tools** by selecting **Faults > Fault Data Manager**. This utility provides functionality to query, delete, update, and rename fault interpretive data.

Fault Import/Export - accessed through the **Seismic Tools > Faults > Fault Import/Export** or through an xterm window with the commands **Fim or Fex**. This utility moves fault data between OpenWorks and non-OpenWorks applications. You can import fault data to OpenWorks from ASCII files and export fault data from OpenWorks tables to ASCII files.

Data Import/ExportWizard - accessed through the OpenWorks command menu, **Data > Import/Export > Data Import/ Export Wizard**.

Fault Data Manager

Introduction

Fault Data Manager is a utility that provides many fault data management capabilities. It allows you to query, delete, update, and rename fault interpretive data produced by Landmark's interpretation software - not only SeisWorks and StratWorks, but also SeisCube, TDQ, Z-MAP Plus, and FZAP! software.

Although Landmark does provide several utilities (Surface/Fault Data Manager, and Interpretation Data Manager) to perform various fault data management tasks, several managers must be used in conjunction with each other to perform the same functions that Fault Data Manager provides in one utility.

Fault Data Manager also makes use of Landmark's Pointing Dispatcher (PD) functionality. Changes made using Fault Data Manager are broadcast to any Landmark applications that are listening, and changes made using Landmark applications are received by Fault Data Manager.

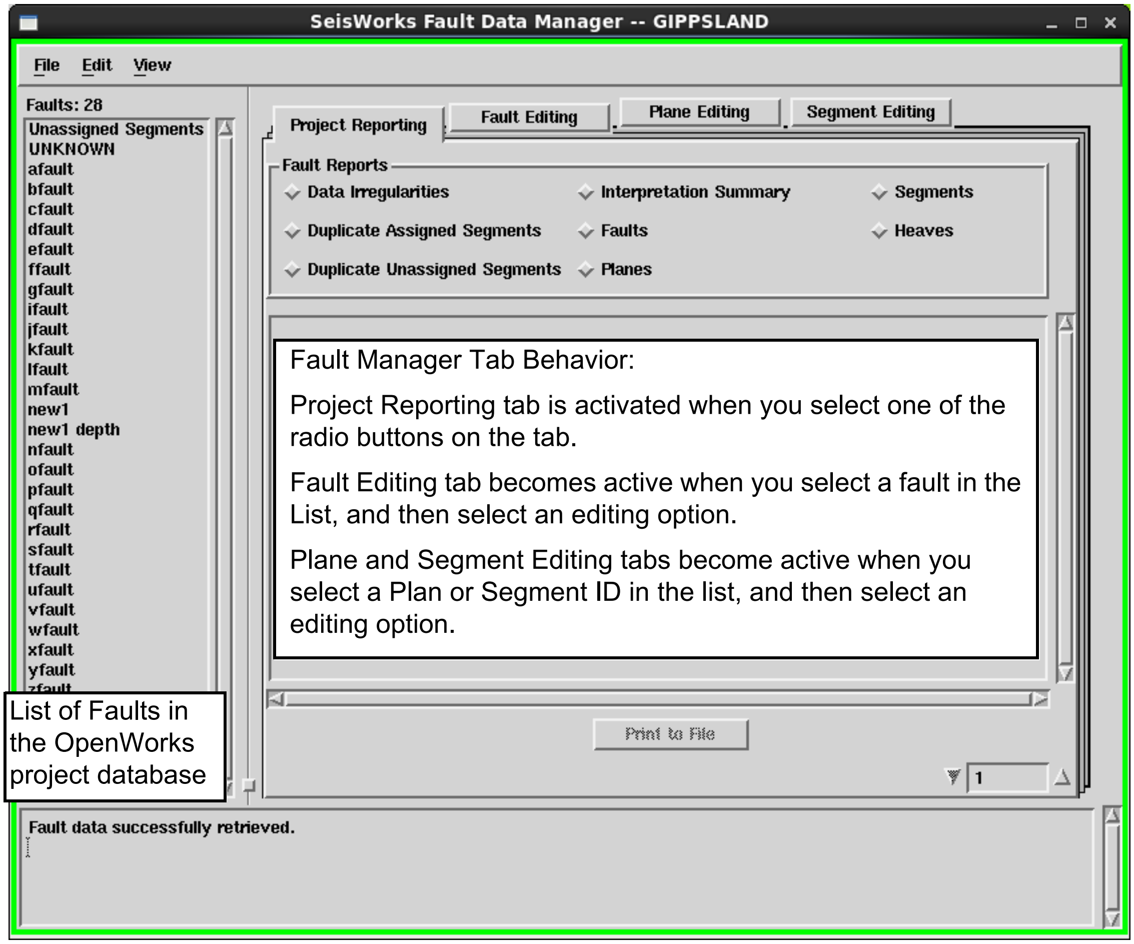
Starting Fault Data Manager

To start Fault Data Manager, select **Faults > Fault Data Manager** from the Seismic Tools command menu. Depending on which session parameters were set before you selected Fault Data Manager, the system may prompt you to set the OpenWorks project and the interpreter.

Fault Data Manager has three main menus:

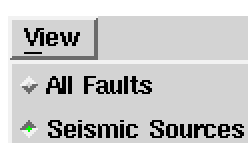
- File
- Edit
- View

Details for these menus are listed below.

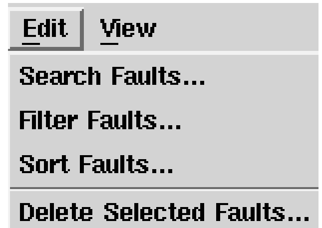


When the Fault Data Manager is launched, all faults in the OpenWorks project database are available for viewing via the list on the left side of the window.

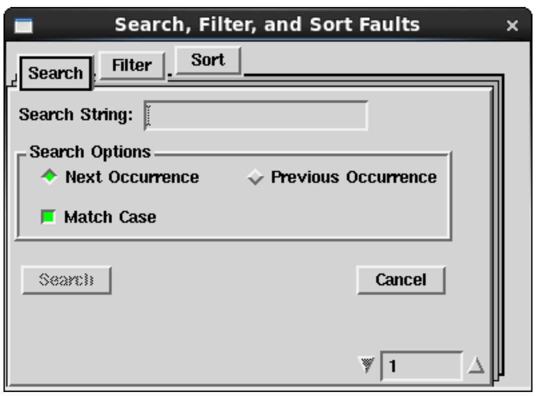
You have the option to view all faults or fault associated with 2D lines or specific 3D surveys by selecting the Seismic Sources radio button in the **View** menu.



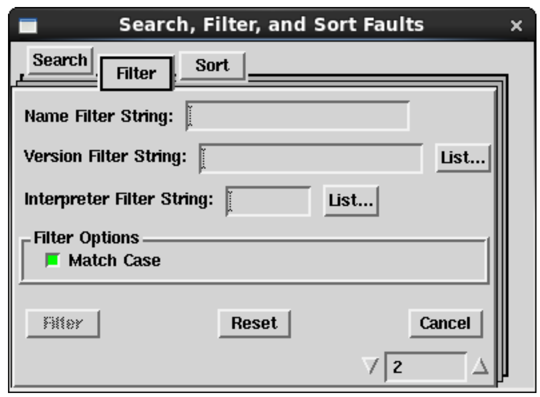
The faults in the OpenWorks project may be searched, filtered, or sorted. You perform these operations from the **Edit** menu options.



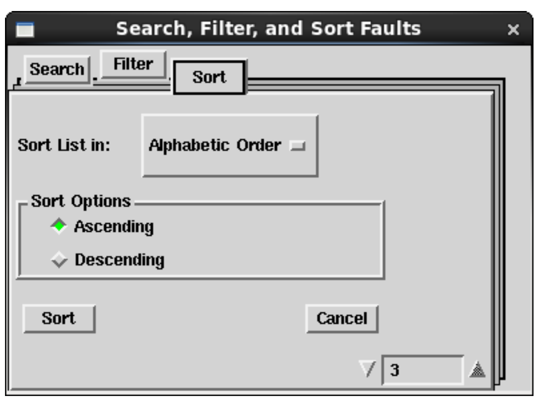
Search Faults...



Filter Faults...



Sort Faults...



Fault Data Maintenance

The **File** menu contains a number of options for maintaining the fault database. You must have MANAGE status to use these options.

File Menu:

Option	Function
Refresh Fault List	Refreshes list of faults after new actions on faults have been taken or faults have been broadcast.
Clean Fault Data	Performs bulk cleansing of corrupt fault data.
Delete All Earliest Duplicates by Fault...	Removes all of the earliest versions of fault segment duplicates by fault.
Delete All Latest Duplicates by Fault...	Removes all of the latest versions of duplicate fault segments by fault.
Delete All Earliest Unassigned Duplicates...	Removes the arliest of unassigned duplicated fault segments.
Delete All Latest Unassigned Duplicates...	Removes the latest version of unassigned duplicate fault segments.

Option	Function
Delete Statistics	Removes tuning statistics on certain SeisWorks fault tables left by the *Tune* function in OpenWorks software.
Delete All Faults	Removes all faults and all related fault data from the OpenWorks project.
Delete ALL SeisWorks Faults Only	Removes only those fault segments generated by SeisWorks software and SeisWorks-related applications. Fault names remain.
Deletes ALL StratWorks Faults Only	Remove only those faults generated by StratWorks software and StratWorks-related applications.
Delete Fault Heaves	Opens the *Delete Fault Heaves* dialog box, where you can delete all fault heaves or certain ones.
Exit (Ctrl + e)	Exits application.

Duplicate Segments Options:

Duplicate segments can cause performance degradations. Duplicate segment deletion makes no differentiation between assigned and unassigned segments or whether the duplicated segments are assigned to different faults. The Delete Duplicate Segments options available in Fault Data Manager are described below:

- Use the **Delete All Earliest Duplicates by Fault** option to remove all of the earliest versions of duplicate fault segments by fault. The latest versions of the fault segments will remain in the OpenWorks project.
- Use the **Delete All Latest Duplicates by Fault** option to remove all of the latest versions of duplicate fault segments by fault. The earliest versions of the fault segments will remain in the OpenWorks project.
- Use **Delete All Earliest Unassigned Duplicates** to remove the earliest version of unassigned duplicated fault segments. The latest versions of the unassigned fault segments remain.
- Use **Delete All Latest Unassigned Duplicates** to remove the latest version of unassigned duplicate fault segments. The earliest versions of the unassigned fault segments remain.

When you have finished performing these delete duplicate segments commands, the changes will be broadcast to any Landmark applications that are listening.

Deleting Statistics:

The *Tune* function in OpenWorks software can reduce data retrieval times and enhance performance with the project database. This option runs an Oracle command to compute statistics on every table, including the amount and distribution of data. These statistics are used by the Oracle cost-based optimizer to build efficient query plans so it can retrieve data more efficiently.

The *Tune* functionality is accessible from the OpenWorks command menu:

OpenWorks > Project > Project Adimin > Project Database > Tune

While it is running, the *Tune* option in OpenWorks software is generally useful in enhancing database performance. But the statistics it generates can cause severe degradation of performance in certain SeisWorks fault retrievals. For example, if a seismic survey has many fault segments and heaves, SeisWorks' performance may deteriorate.

In Fault Data Manager, you use the **Delete Statistics** option to remove tuning statistics on certain SeisWorks fault tables left by the *Tune* function.

For more information about the Tune function in general, see **OpenWorks > Project Admin > Help > Project Administration > Related Topics: Managing Project Databases**.

Deleting SeisWorks Faults:

Use the **Delete ALL SeisWorks Faults Only** option to remove only those fault segments generated by SeisWorks and SeisWorks-related applications from the OpenWorks project. Fault names will remain.

SeisWorks-related applications are SeisCube, FZAP!, and TDQ, which converts StratWorks faults to SeisWorks faults.

Deleting StratWorks Faults:

Use the **Delete ALL StratWorks Faults Only** option to remove only those faults generated by StratWorks and StratWorks-related applications from the OpenWorks project.

StratWorks-related applications are Z-MAP Plus and TDQ, which converts SeisWorks faults to StratWorks faults.

Deleting All Faults from the OpenWorks Project:

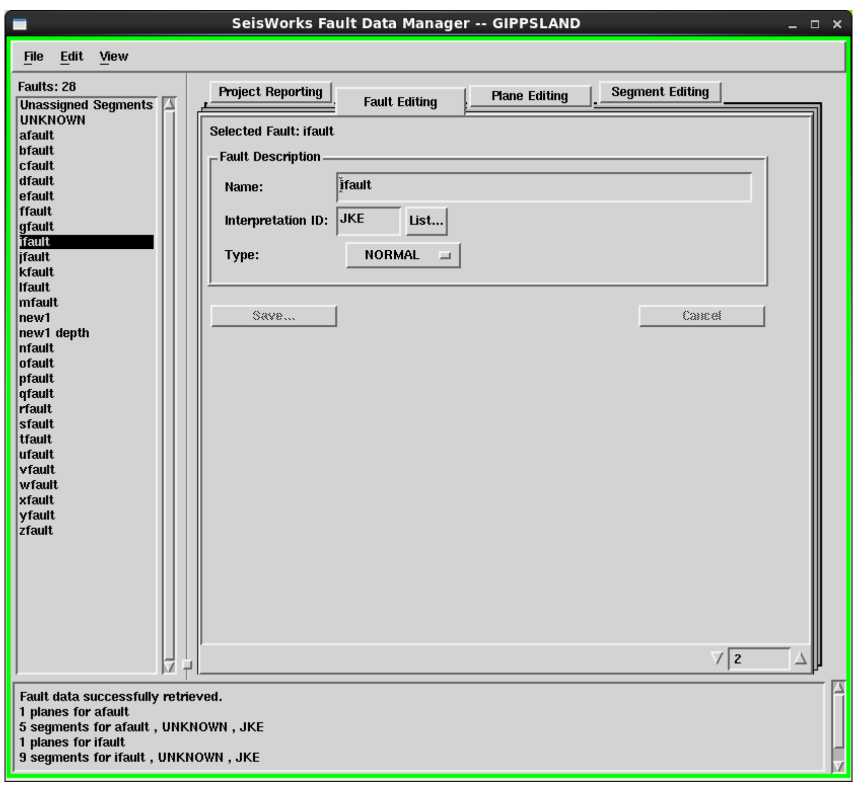
Use the **Delete All Faults** option to remove all faults and all related fault data from the OpenWorks project.

This option will delete all faults generated by SeisWorks, SeisCube, FZAP!, StratWorks, Z-MAP Plus, and TDQ.

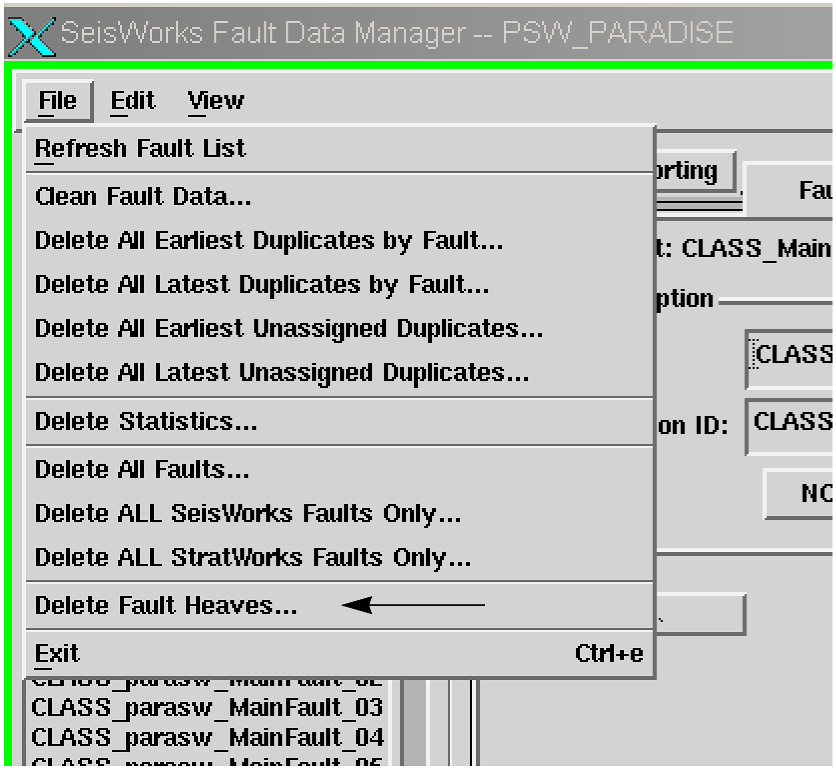
Delete Fault Heaves:

When you select this option from the menu, the *Delete Fault Heaves* dialog box appears.

Select a fault or faults with heaves to activate the delete heaves option.

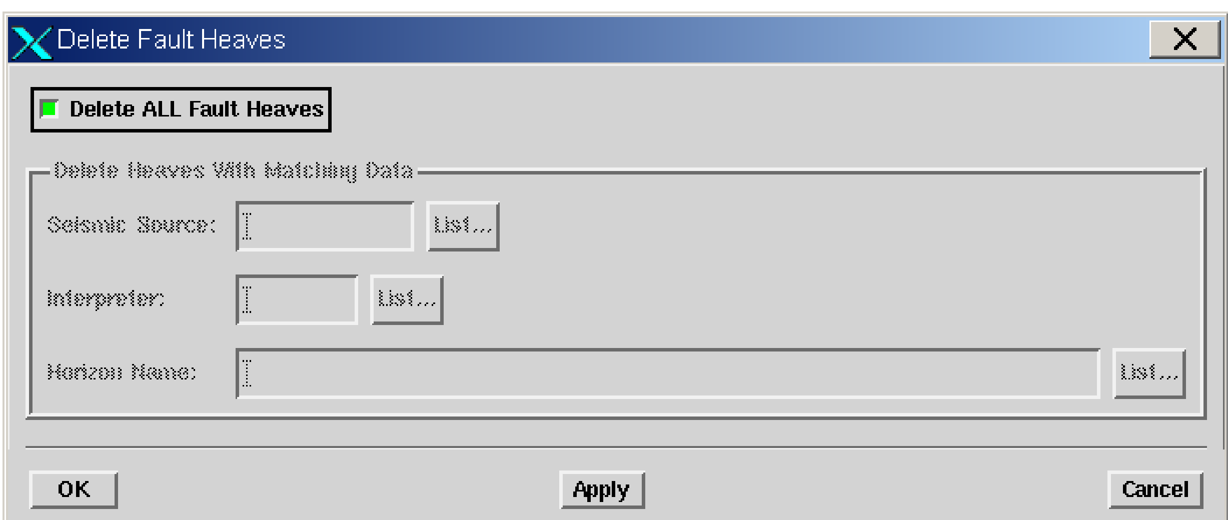


Select **File > Delete Fault Heaves…** to start the deletion process.



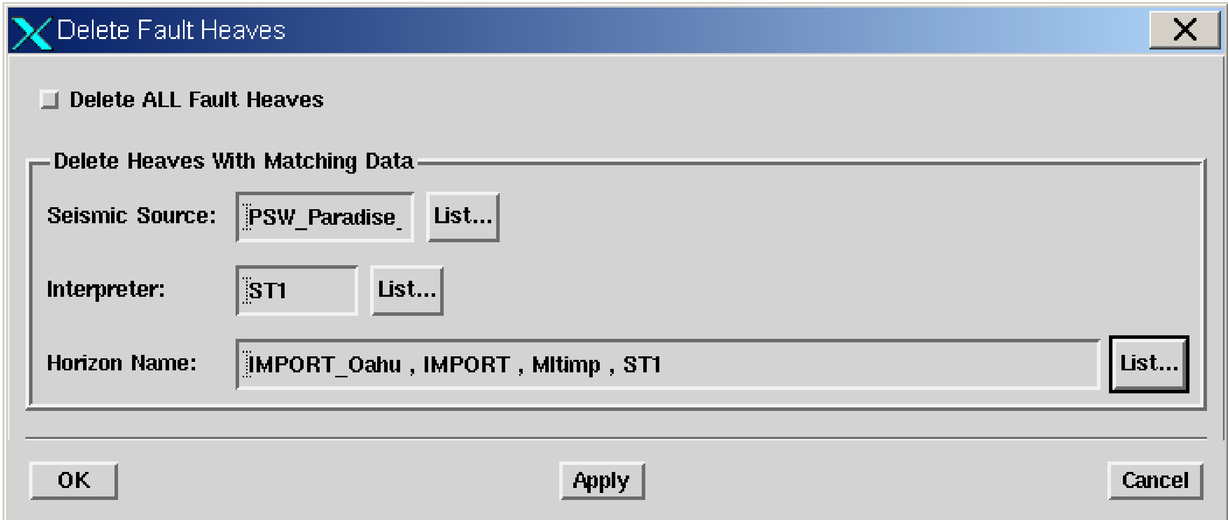
There are two delete options:

- Delete ALL Fault Heaves



By default, *Delete ALL Fault Heaves* is toggled on. If you accept this default, click **Apply** or **OK** to delete all fault heaves.

- Delete Heaves With Matching Data



If you wish to delete only certain fault heaves, deselect *Delete ALL Fault Heaves*.

The choices in the *Delete Heaves With Matching Data* panel become available.

They are:

- Seismic Source - Click the **List...** button and select from the source listed in the *Seismic Source Select* dialog box. Click **OK** in that dialog box.
- Interpretation - Click **List...** and select the name from the *Interpreter Select* dialog box. Click **OK** in that dialog box.
- Horizon Name - Click **List...** and select from the *Horizon Select* dialog box. Click **OK** in that dialog box.

Return to the *Delete Fault Heaves* dialog box and click **Apply** or **OK**. The fault heaves you selected are deleted.

Fault Reports

When Fault Data Manager opens the Project Reporting tab is active.

This function allows you to create a variety of reports on *all faults in the OpenWorks project*. You cannot subset the faults for a report, such as highlighting a specific fault. No matter what is highlighted in the list tree, reports are generated for all faults in the project.

The following reports are available:

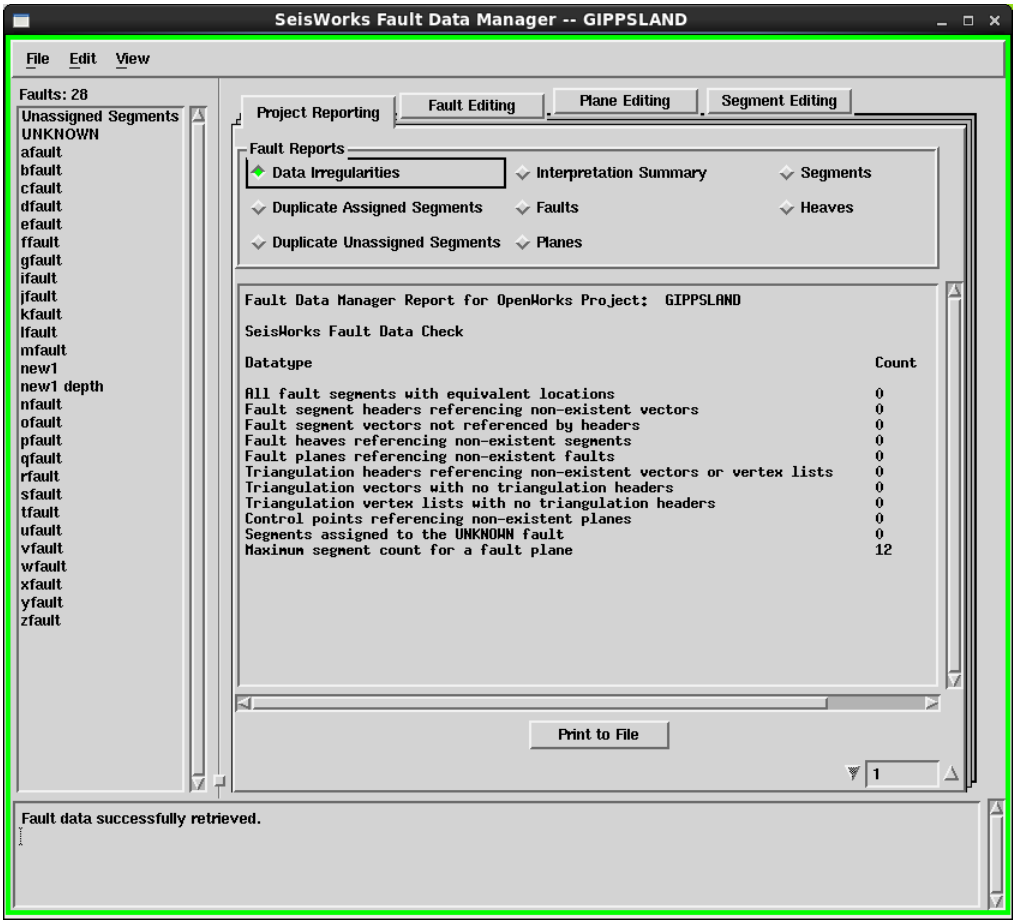
- Data Irregularities Report - displays fault data anomalies in the OpenWorks project.

  In general, anomalies are data with referential integrity problems and data that do not comply with SeisWorks software limitations. The *Count* column shows the number of items found for each data type.

  Corrupt Fault Data may occur when:

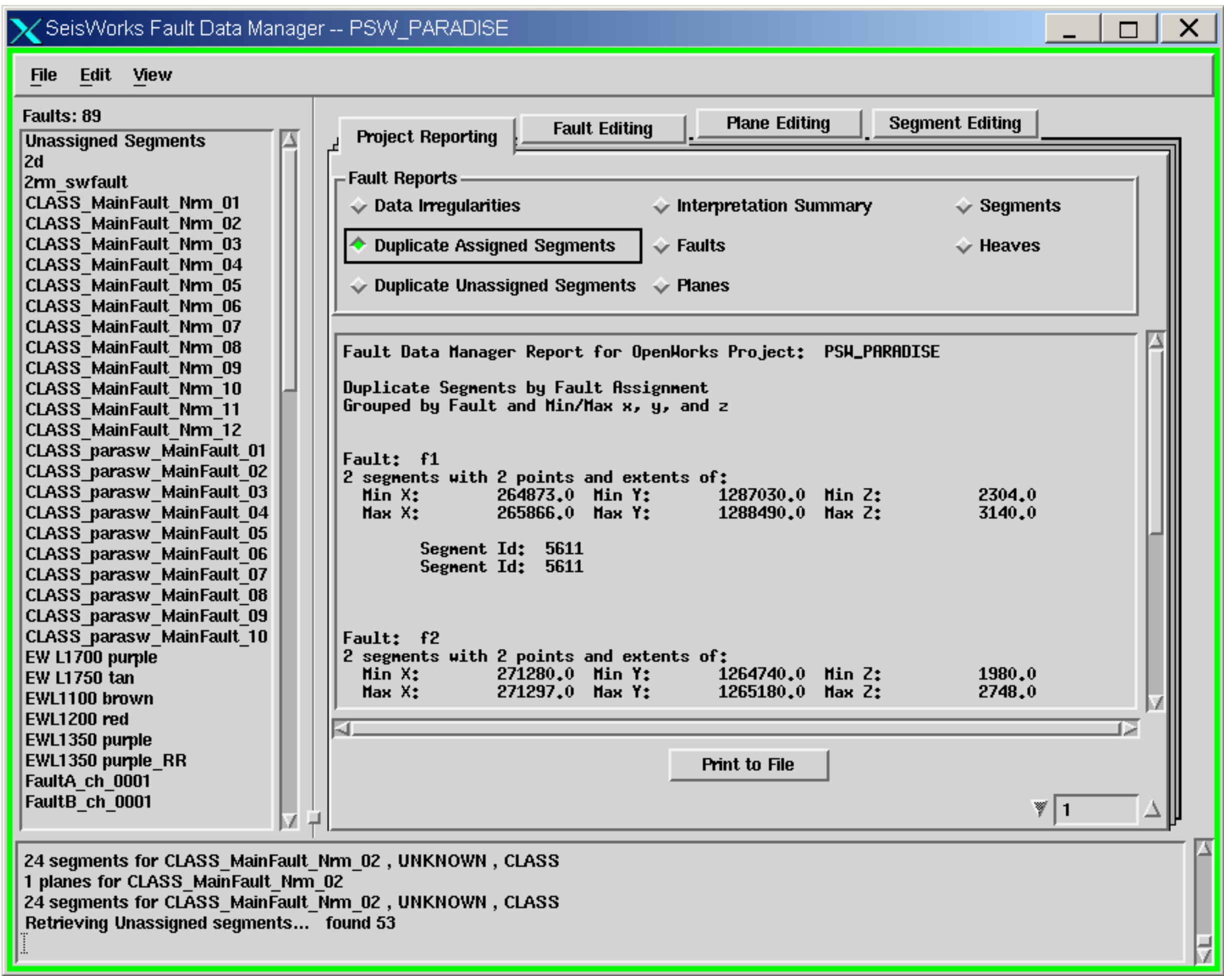
  — SeisWorks writes corrupt fault data to OpenWorks because of faulty transaction management

  — An OpenWorks project restore fails because of insufficient project tablespace

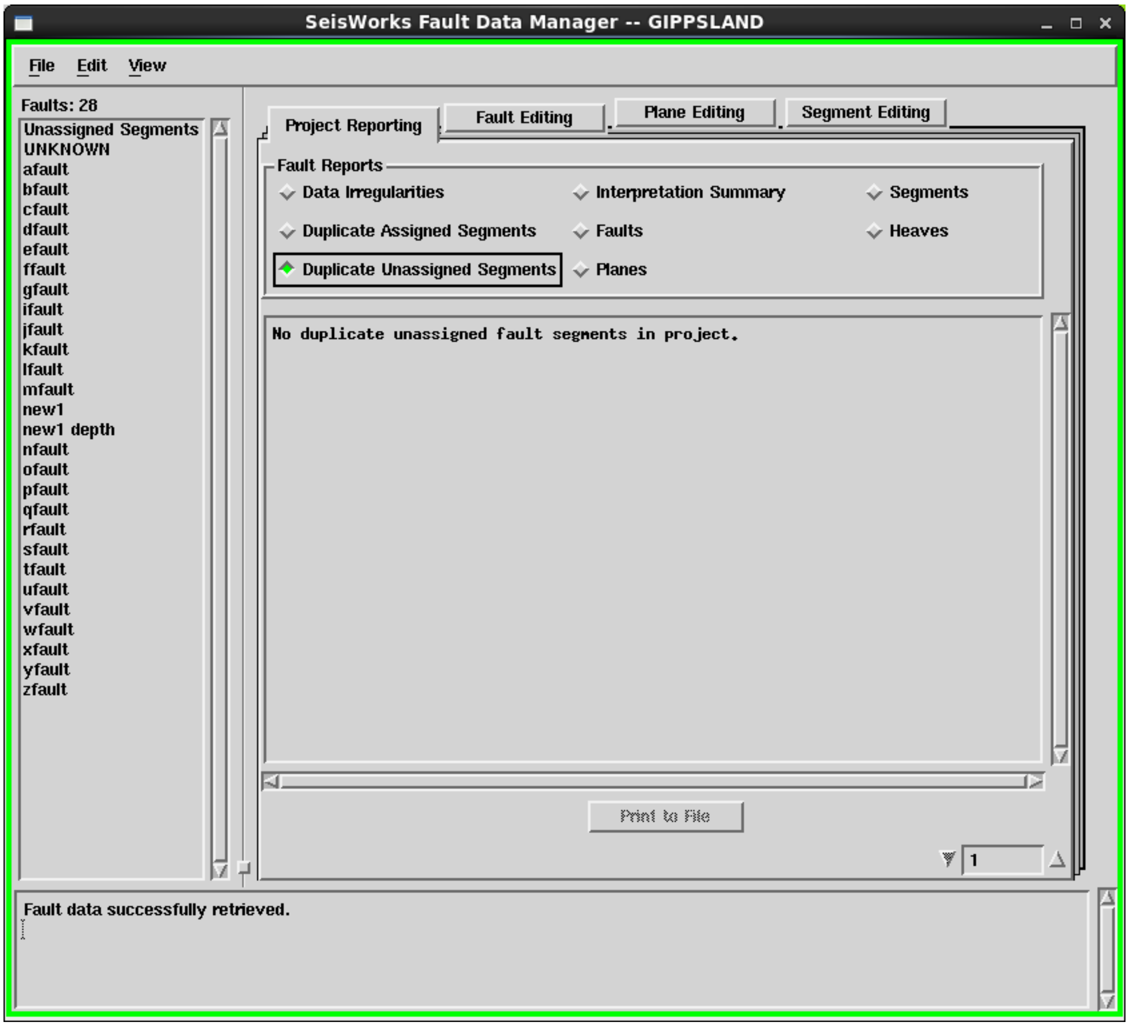

SeisWorks Fault Data Manager -- GIPPSLAND
File Edit View
Faults: 28
Unassigned Segments
UNKNOWN
afault
bfault
cfault
dfault
efault
ffault
gfault
ifault
jfault
kfault
lfault
mfault
new1
new1 depth
nfault
ofault
pfault
qfault
rfault
sfault
tfault
ufault
vfault
wfault
xfault
yfault
zfault
Project Reporting
Fault Editing
Plane Editing
Segment Editing
Fault Reports
Data Irregularities
Interpretation Summary
Segments
Duplicate Assigned Segments
Faults
Heaves
Duplicate Unassigned Segments
Planes
Fault Data Manager Report for OpenWorks Project: GIPPSLAND
SeisWorks Fault Data Check
Datatype
Count
All fault segments with equivalent locations 0
Fault segment headers referencing non-existent vectors 0
Fault segment vectors not referenced by headers 0
Fault heaves referencing non-existent segments 0
Fault planes referencing non-existent faults 0
Triangulation headers referencing non-existent vectors or vertex lists 0
Triangulation vectors with no triangulation headers 0
Triangulation vertex lists with no triangulation headers 0
Control points referencing non-existent planes 0
Segments assigned to the UNKNOWN fault 0
Maximum segment count for a fault plane 12
Print to File
1
Fault data successfully retrieved.

- Duplicate Assigned Segments Report - summarizes duplicate fault segments in the OpenWorks project.

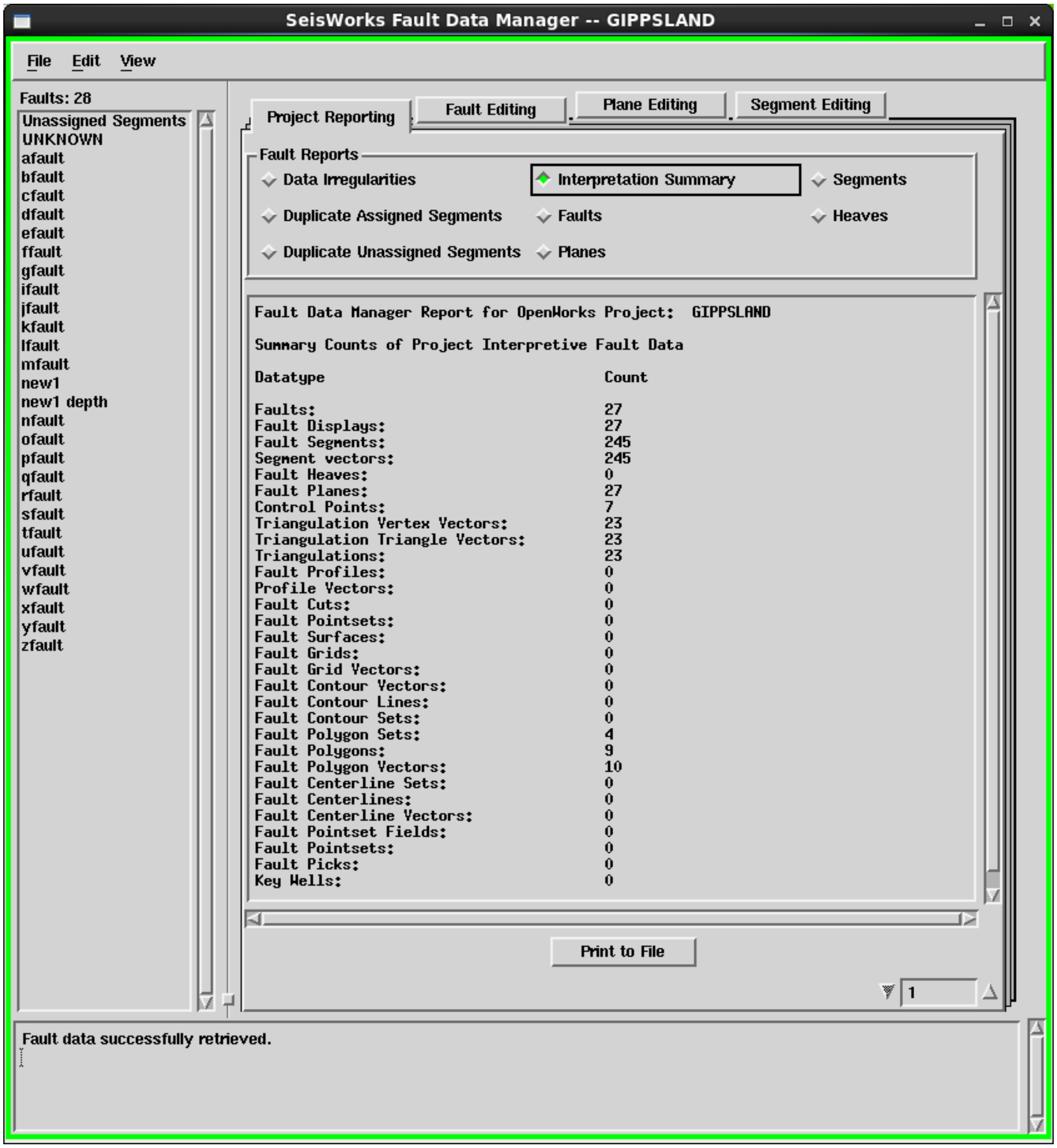
  The fault segments are grouped by minimum and maximum x, y, and z coordinate values and the number of points in the segment. Within these groupings, information about the fault segment and the fault to which the segment is assigned are also displayed.



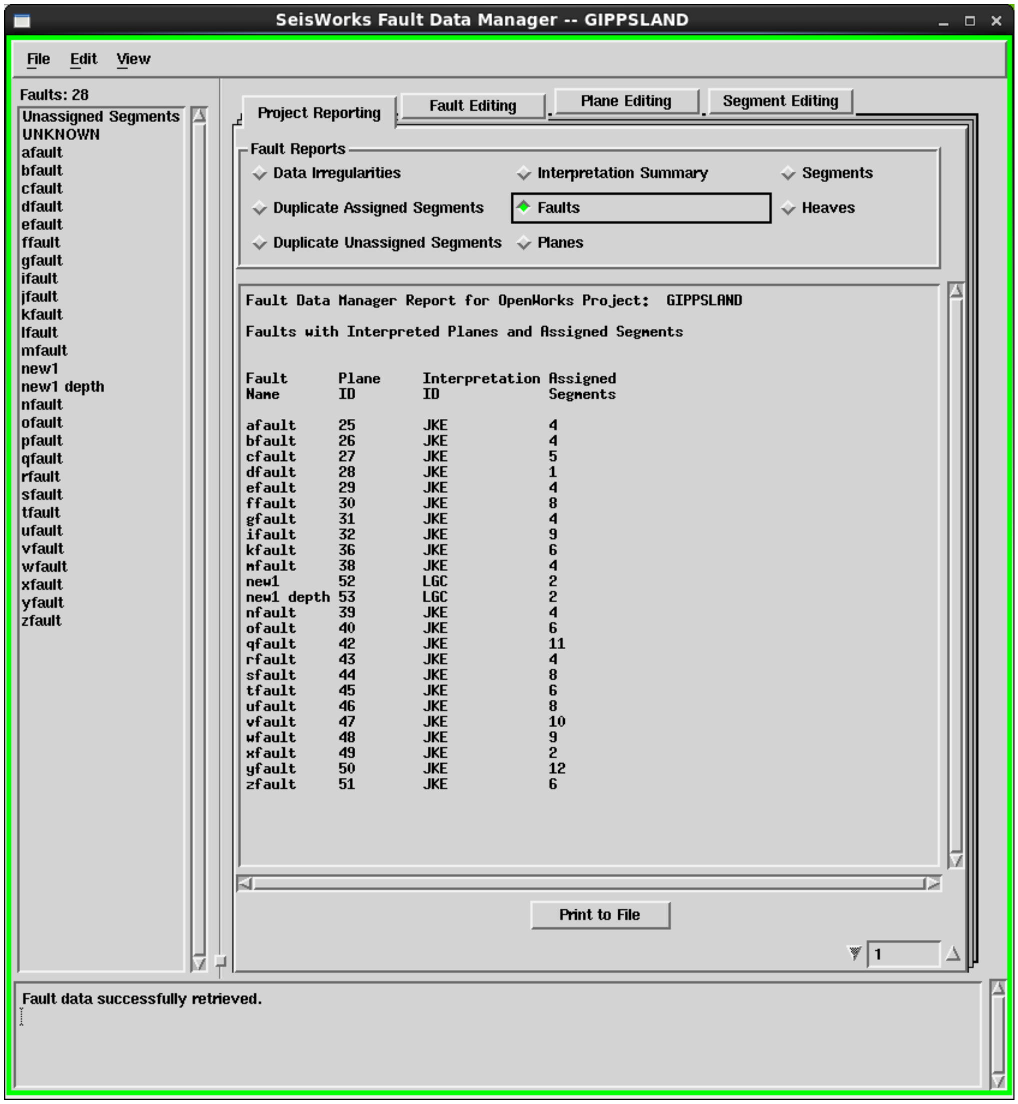
- Duplicate Unassigned Segments - a report similar to Duplicate Assigned Segments displays information about Duplicate Unassigned Segments.



- Interpretation Summary Report - displays fault interpretations in the OpenWorks project, grouping these by the interpretation type. The number of occurrences of each is also displayed.



- Faults Report - displays all of the fault segments in the OpenWorks project and includes fault name, plane ID, interpretation ID, and the number of assigned segments.



- Planes Report - displays all of the fault-to-fault plane relationships in the OpenWorks project.

  This report includes:

  — plane ID

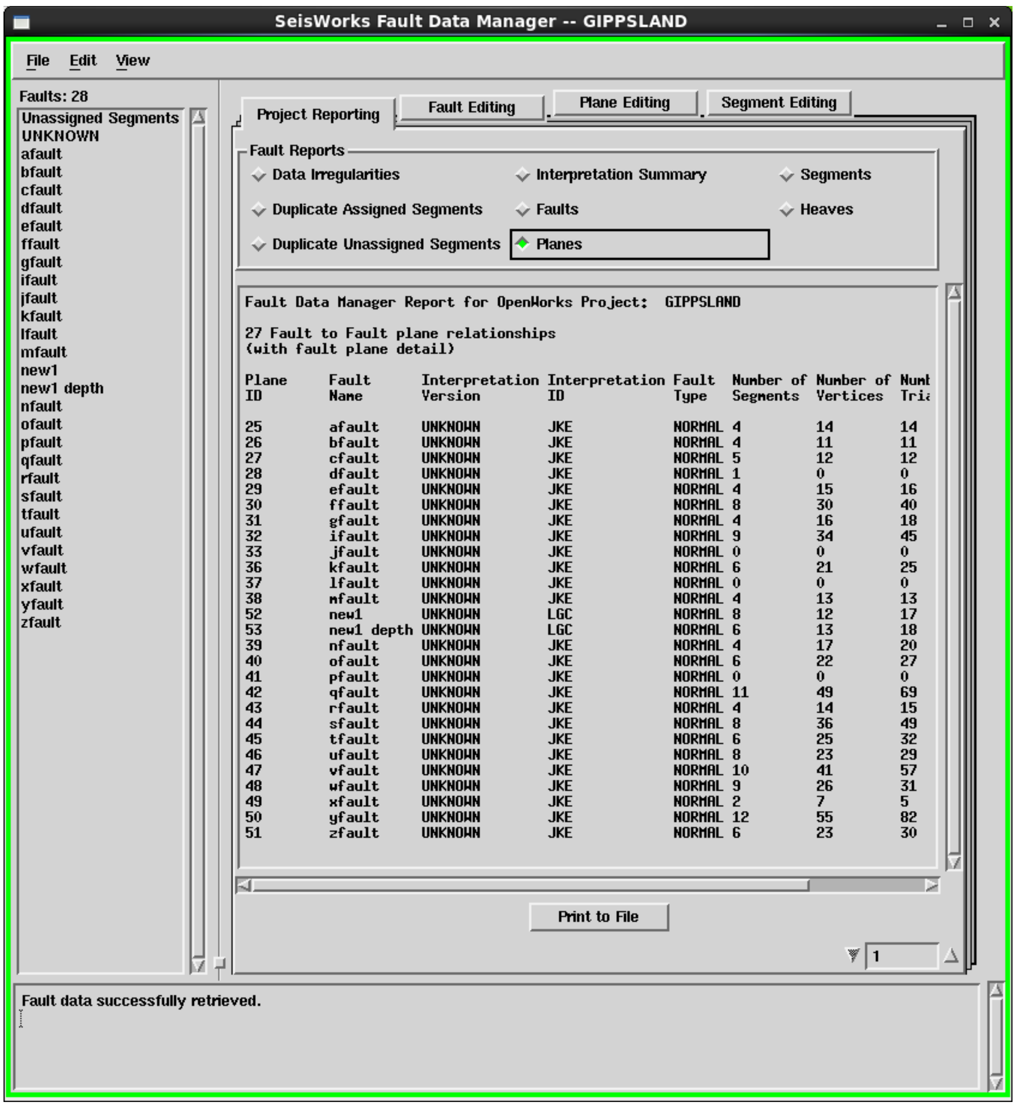
  — fault name

  — interpretation version

  — interpretation ID

  — fault type

  — the number of segments, vertices, triangles, and control points



- Segments Report - displays a summary of the fault segments in the OpenWorks project.

  Data in this report include:

  — segment ID

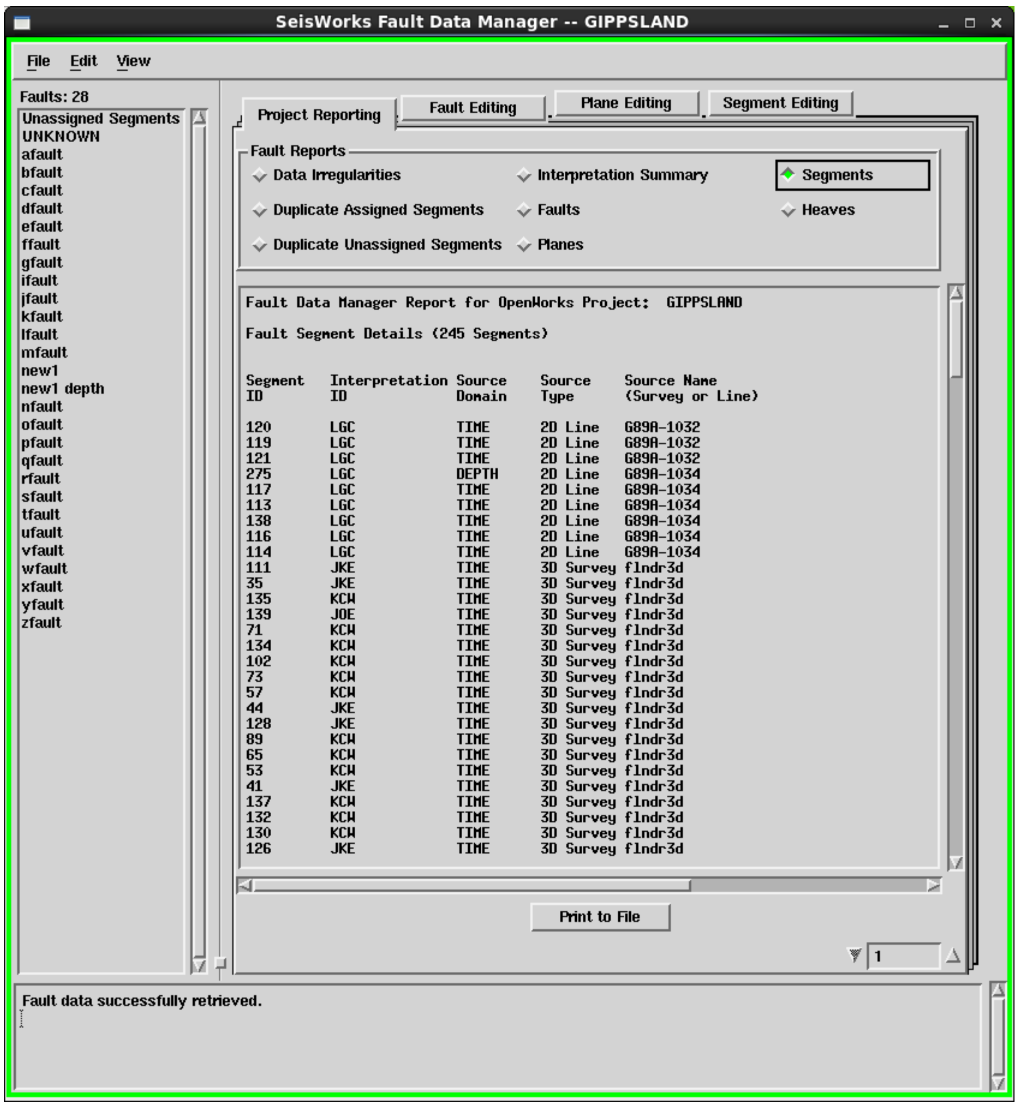
  — interpretation ID

  — source domain, type, and name

  — number of points

  — fault plane assignment

  Some of these properties may be edited.



- Heaves Report - summarizes the interpreted fault heaves in the OpenWorks project.

  This report displays:

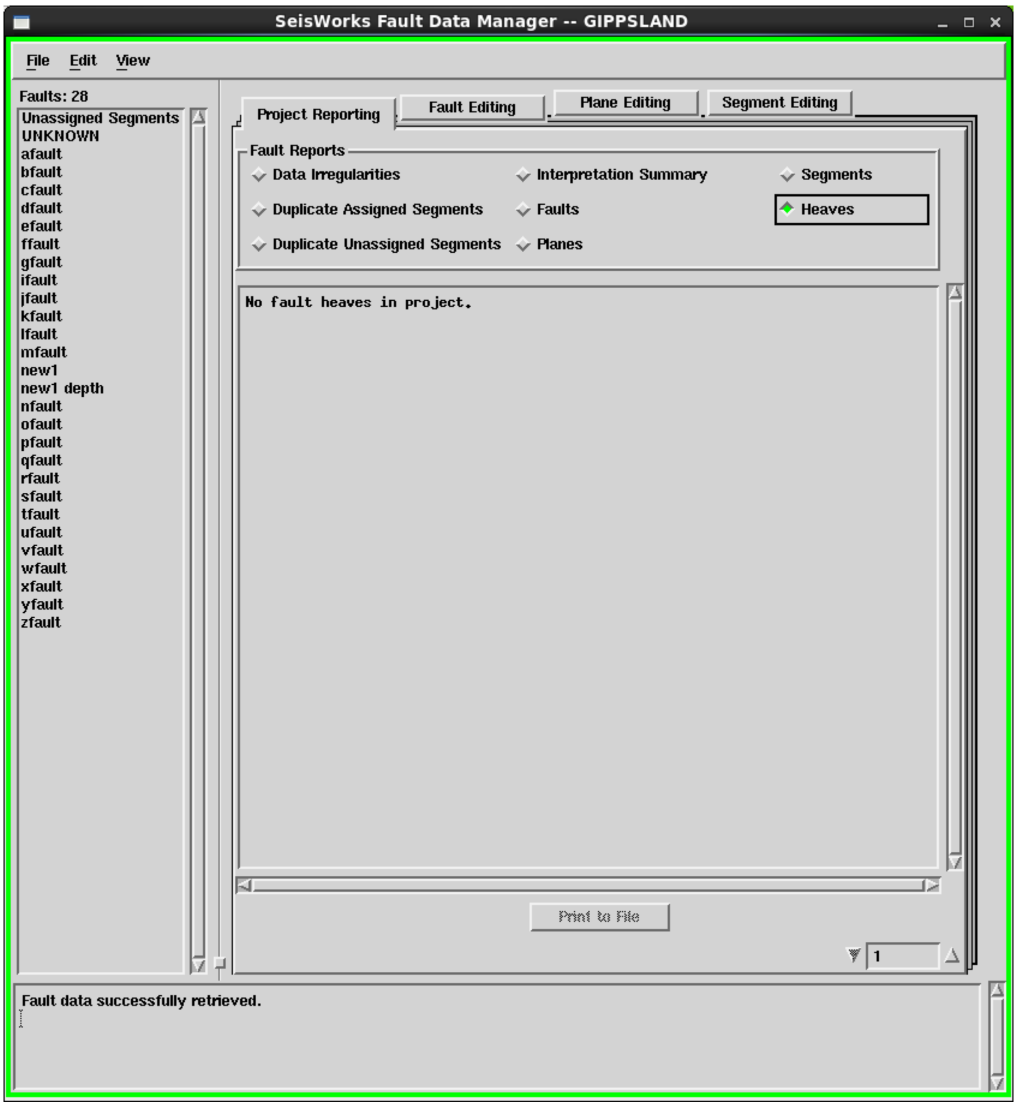
  — the number of fault heaves in the OpenWorks project

  — the interpretation ID

  — segment ID

  — horizon name, attribute, version, and interpretation ID

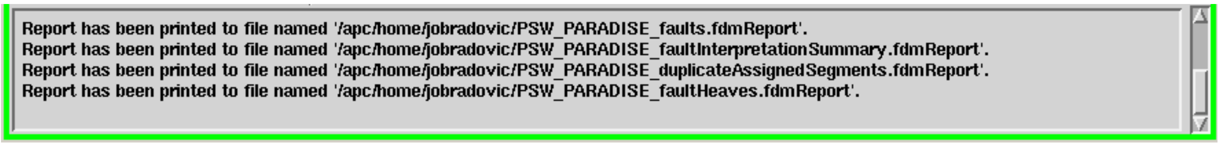
  — upthrown and downthrown x, y, and z coordinate values



To view any of these reports, simply click the appropriate radio button on the OpenWorks Project Reporting tab. Use the horizontal and vertical scroll bars to navigate through a report.

Before each report is generated, the report window is cleared. To save a report, click **Print to File**. The file is written to your home directory.

The filename will be reported in the Status Area and will have the extension **<OpenWorks_project_type_of_report>.fdmReport**. See examples below.

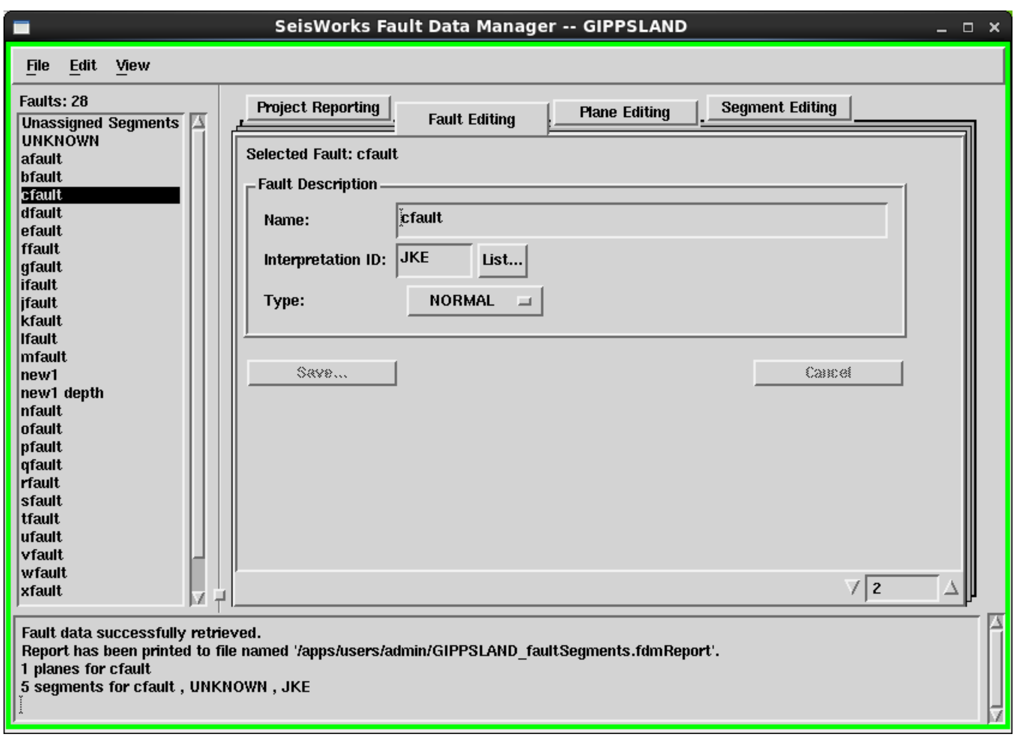


Fault Editing

The second tab in Fault Data Manager brings up the Fault Editing window. Highlight a fault to change:

- Fault Name
- Interpretation ID
- Fault Type

If you make a change, the **Save…** and **Cancel** buttons activate. Use the **Cancel** button to unset any changes you have made. If you like the changes you have made, click the **Save…** button to save the changes to the database.

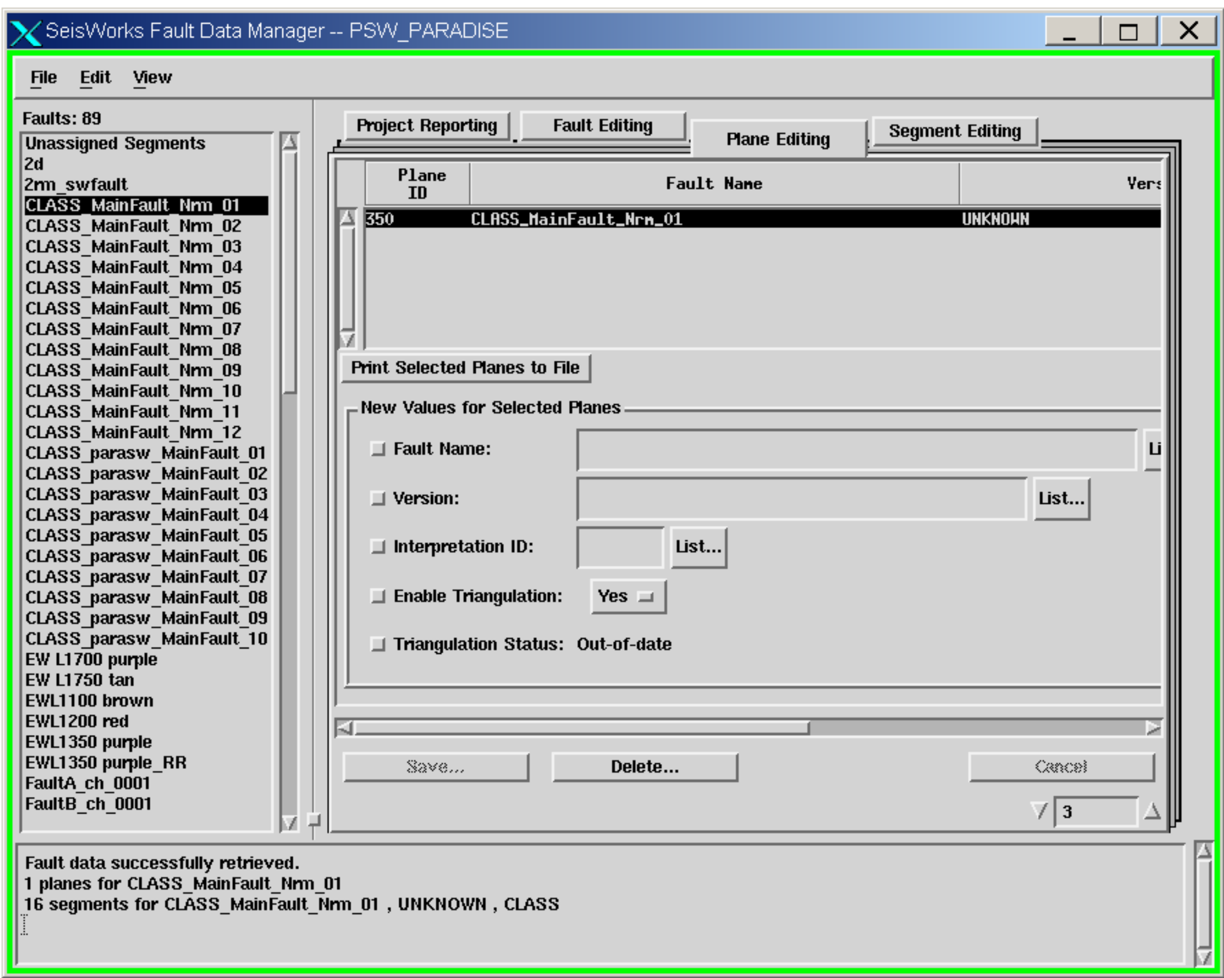


Plane Editing

The third tab in Fault Data Manager brings up the Plane Editing window. Highlight a fault to change:

- Fault Name
- Version
- Interpretation ID
- Enable Triangulation option
- Triangulation Status

You must select at least one of these categories to make the *Save* button active. Click **Save…** to make the change. A *Confirm Update* dialog box will appear warning you that the updates cannot be undone. Click **Yes** in this dialog box to continue.

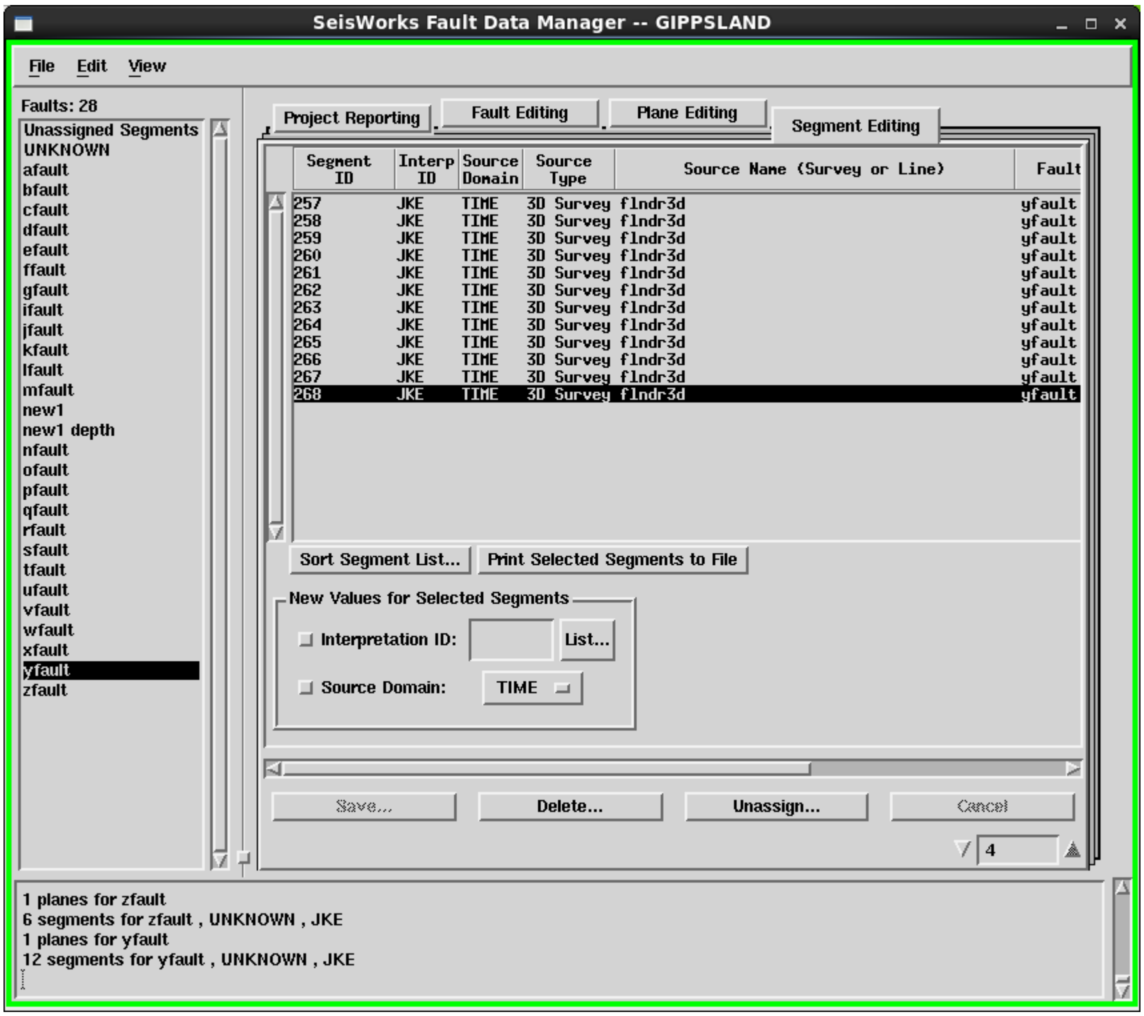


Segment Editing

The last tab in Fault Data Manager brings up the Segment Editing window. Highlight a segment to change:

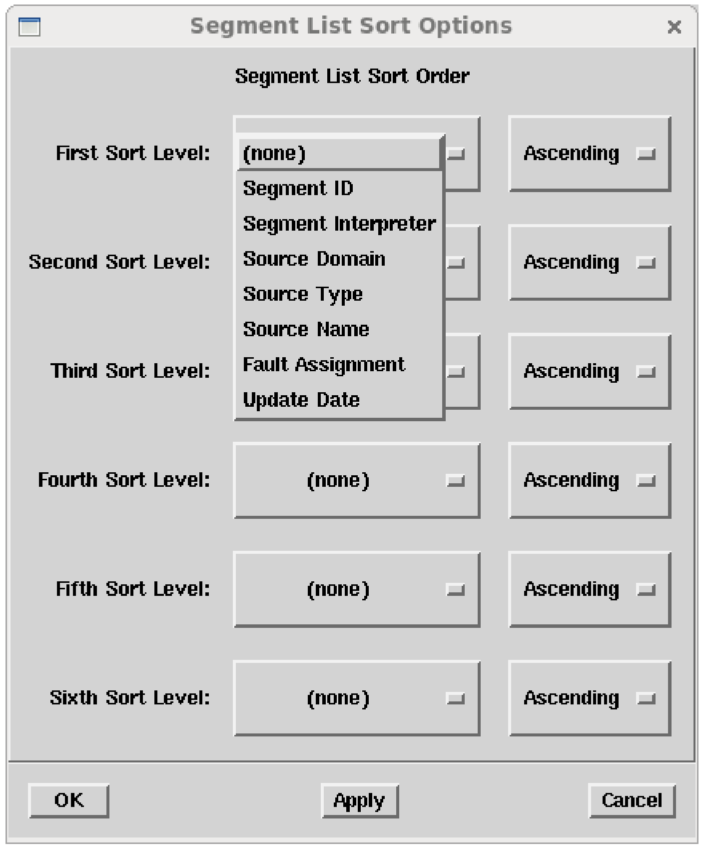
- Interpretation ID
- Source Domain

You must make at least one change to activate the **Save…** button.



Additional options:

— **Sort Segment List…** allows you to perform an ordered sort of the segment list.



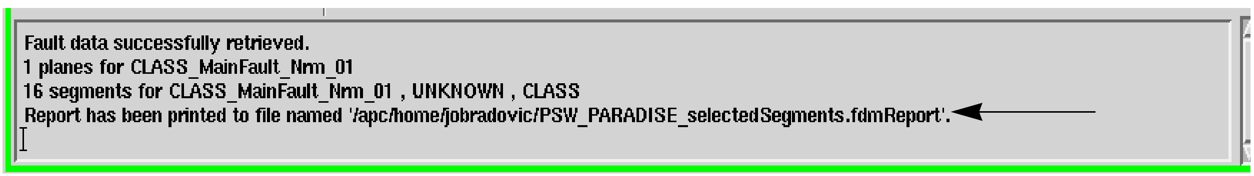
Segment Editing options:

— **Save…** commits any changes made for the Interpretation ID or Source Domain.

— **Delete…** allows you to delete the selected segment.

— **Unassign…**allows you to unassign the selected segment.

— **Print Selected Segments to File…** prints the information about the selected segments to an ASCII file in your home directory. The name of the file is reported in the Status area and has the extension *selectedSegments.fdm.Report*.



Fault Import and Export Options

The SeisWorks Fault Import (*Fim*)/Export (*Fex*) utilities moves fault data between the OpenWorks database and ASCII files.

Data Import Utility is another option for importing and exporting fault data between the OpenWorks database and ASCII files.

Project Data Transfer may be used to transfer fault data from SeisWorks software, that is, fault planes and fault segments created in the SeisWorks software and related geophysical interpretation software (FZAP!, SeisCube). It can also transfer fault data generated in the geologic products such as the StratWorks software. However, PDT does not transfer fault heaves, since those can be recalculated using the SeisWorks software.

By default, PDT will transfer all existing data for a selected fault list, but you can select a more limited set of data items if you wish. For example, if you have interpreted data, you can transfer data just from specified interpreters.

*Fault Import (*Fim*)/Export (*Fex*) Utilities*

To use the *Fim* import tool:

- Run `Fim` at a command line.
- Or, select **Fault > Import** from the Seismic Tools command menu.

To use the *Fex* export tool:

- Run `Fex` at a command line.
- Or, select **Fault > Export** from the Seismic Tools command menu.

To open the Seismic Tools launcher, select **Data > Management > Seismic Tools** from the OpenWorks launcher.

Fie and Fex use a format file to place specific fault data in an OpenWorks database into an ASCII (export), or assign data in an ASCII file to fault data tables in OpenWorks.

The following Default Format is the only format available for Fex and Fim. Note that the default format changed between Release 5000.0.1.x and 5000.0.2.x.

Environmental variable for faults with pre-R5000.0.2.0 format

If you need to import faults with an old Release 5000.0.0 format (before Release 5000.0.2.0), you must set the environmental variable SW_FIE_R5000_OLD1. A default color of green is used with this environmental variable.

This format specifies that:

- Fault data will be imported or exported in x,y,z format.
- The fault points' x values will be found in columns 1 through 12 of the ASCII file.
- The y values will be in columns 13 through 24.
- The z values will be in columns 25 through 36.
- For assigned segments, the fault color will be specified in columns 37 through 48, in RGB format. No fault color will be exported or imported for unassigned segments. Note that there is a space in columns 40, 44, and 48 after each of the RGB values.
- The point type (beginning, intermediary, or ending segment point, or fault control point) will be specified in column 51 or 52.
- The fault name will be in columns 53 through 102.
- The fault (plane) version, which you specify when you create a fault, will be in columns 103 through 122.
- The interpreter who created the fault data will be identified in columns 123 through 127.
- The domain in which the fault data was interpreted will be specified in columns 128 through 139.
- The seismic source (line or survey) in which the fault data was interpreted will be identified in columns 140 through 179.
- The units in which surface distances are measured will be specified in columns 180 through 199.
- The units in which times or depths are measured will be specified in columns 200 through 205.

Table Displaying the Default Format File Assignments:

Record	Column Definition Keyword	Column	Range
1	FEX_FAULT_X	1	12
2	FEX_FAULT_Y	13	24
3	FEX_FAULT_Z	25	26
4	FEX_FAULT_COLOR_R	37	39
5	FEX_FAULT_COLOR_G	41	43
6	FEX_FAULT_COLOR_B	45	47
7	FEX_FAULT_TYPE	49	50
8	FEX_FAULT_PTYPE	51	52
9	FEX_FAULT_NAME	53	102
10	FEX_FAULT_VERSION	103	122
11	FEX_FAULT_INTERPRETER	123	127
12	FEX_FAULT_DOMAIN	128	139
13	FEX_FAULT_SOURCE_NAME	140	179
14	FEX_FAULT_DISTANCE_UNIT	180	199
15	FEX_FAULT_DOMAIN_UNIT	200	205

Keywords for Fault Format Files

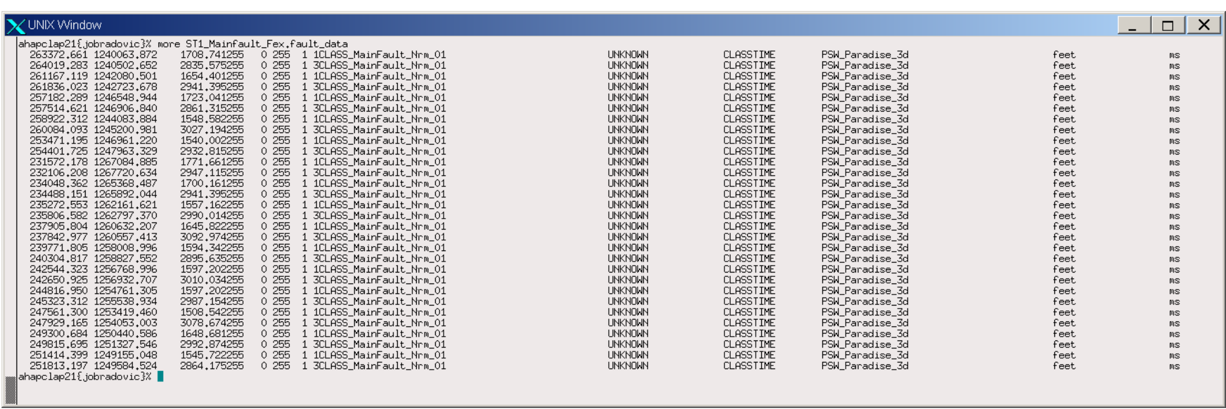
The valid keywords that can be used in format files for importing or exporting fault data are listed in the following table.

Keyword	Description
FAULT_X	Specifies the field in the ASCII file for the real world x coordinates, which are assumed to be double-precision numbers. Required in file formats that include FAULT_Y.
FAULT_Y	Specifies the field in the ASCII file for the real world y coordinates, which are assumed to be double-precision numbers. Required in file formats that include FAULT_X.

Keyword	Description
FAULT_Z	Specifies the field in the ASCII file for the real world z coordinates, which are assumed to be double-precision numbers. Required in all file formats.
FAULT_COLOR	Specifies the field in the ASCII file for the fault color, which, in RGB format, is assumed to be a set of three integers valued from 000 to 255, each value corresponding to the red, green, and blue values of the fault color. FAULT_COLOR is not required in any format file. If no fault color is specified for input, a default color of green will be assigned to the fault. If no fault color is present for output, the integers will be valued at 000 for red, green, blue. When a Fie job is finished, the index of 6, which is green, is stored in database for the new fault plane.
FAULT_TYPE	Specifies the field in the ASCII file for the fault type, which is assumed to be an integer. FAULT_TYPE is not required in any format file. Possible fault types are: 1 for normal fault 2 for reverse fault 3 for strike-slip fault If fault type is not present in an input file, the default entry for the fault plane will be 1 (normal fault). If no fault type value is present for output, no fault type will be written to the output file.
FAULT_PTYPE	Specifies the field in the ASCII file for the point type. FAULT_PTYPE is required in all fault format files. type 1 - starting point of segment type 2 - intermediary points of a segment type 3 - endpoint of segment type 4 - fault control point
FAULT_NAME	Specifies the field in the ASCII file for the fault name, which is assumed to be alphanumeric. FAULT_NAME is not required in any format file. If no fault name is available for import, the fault segments are entered into the database as unassigned fault segments. If no fault name is available for export, no fault name will be written to the ASCII file. If FAULT_NAME is used, unassigned segments can be indicated by leaving this data field blank or by using #UAS# as the first five characters in this field. For assigned segments, every record must include the fault name. On import, fault names longer than the 50 characters allowed by OpenWorks will be truncated. On export, fault names longer than the field specified by the format file will be truncated.

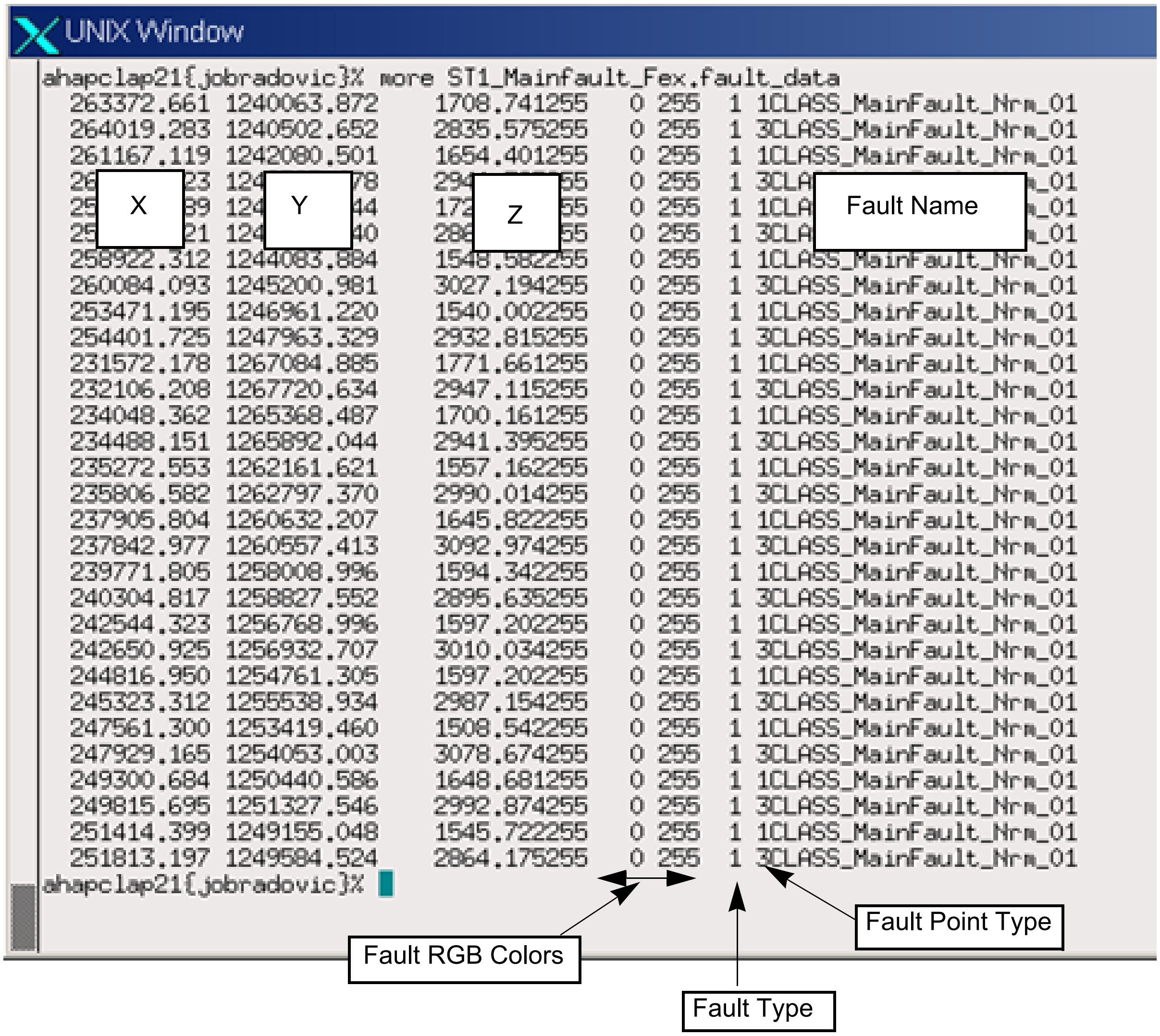
Keyword	**Description**
FAULT_VERSION	Specifies the field in the ASCII file for the fault plane version, which you specify when you create a fault plane in SeisWorks software.
FAULT_INTERPRETER	Specifies the field in the ASCII file for the interpretation ID designation to be associated with the fault data. The interpretation ID specified on import must be a valid interpreter for the OpenWorks project, and the person importing the data must have the right to use that interpreter designation. Users with manage rights have access to all interpretations IDs in the project; other users have access only to those interpretation ID designations that belong to their login account.
FAULT_DOMAIN	Specifies the field in the ASCII file for the domain (TIME or DEPTH) in which the fault data was interpreted. If FAULT_DOMAIN is not included, the domain defaults to time. If you are using time units other than ms, i.e., sec, do not use FAULT_DOMAIN.
FAULT_SOURCE_NAME	Specifies the field in the ASCII file for the name of the line or survey in which the fault data was interpreted.
FAULT_DISTANCE_UNIT	Specifies the field in the ASCII file for the units used to measure surface distances. These units must be specified in valid OpenWorks terminology.
FAULT_DOMAIN_UNIT	Specifies the field in the ASCII file for the units used to measure z values (times or depths). Valid domain units are sec, ms, feet, or meters. If the domain is defaulted to time, the domain units are assumed to be ms.

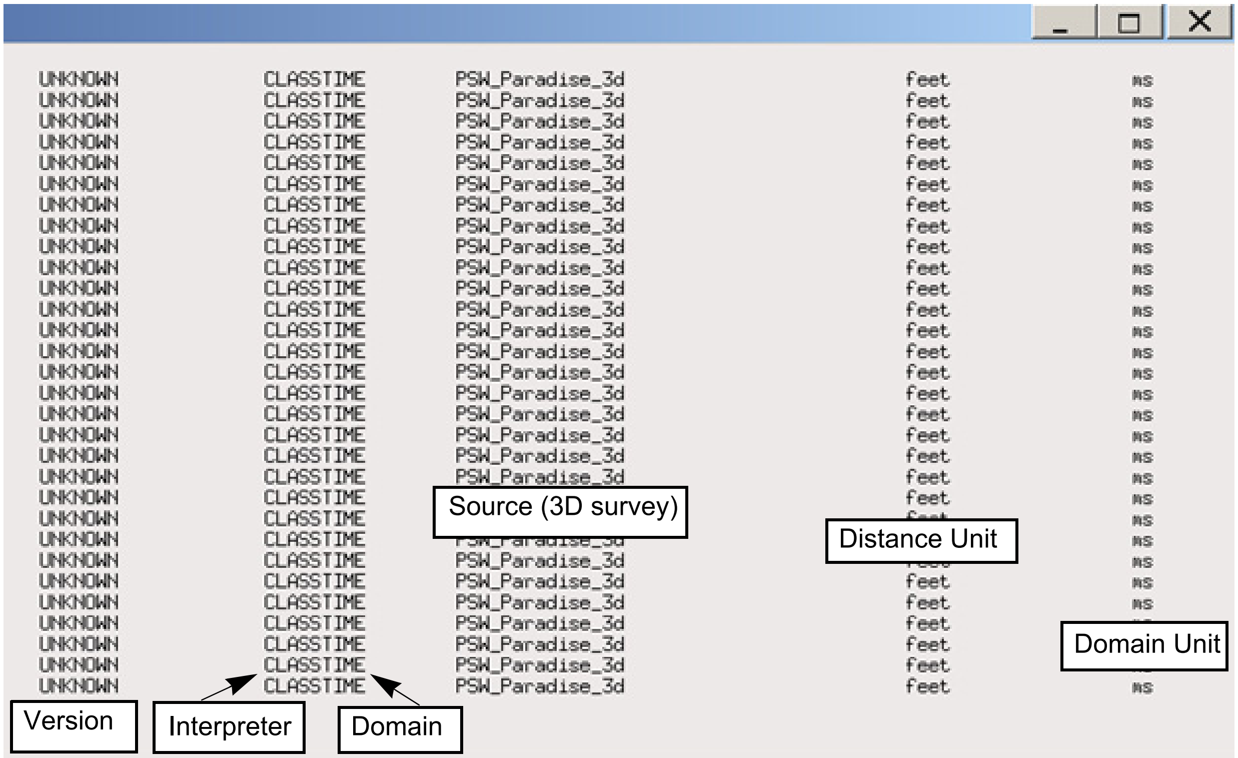
Example of Default Export File:



```
UNIX Window
ahapclap21{jobradovic}% more ST1_Mainfault_Fex.fault_data
  263372.661 1240063.872    1708.741255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  264019.283 1240502.652    2835.575255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  261167.119 1242080.501    1654.401255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  261836.023 1242723.678    2941.395255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  257182.289 1246548.944    1723.041255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  257514.621 1246906.840    2861.315255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  258922.312 1244083.884    1548.582255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  260084.093 1245200.981    3027.194255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  253471.195 1246961.220    1540.002255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  254401.725 1247963.329    2932.815255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  231572.178 1267084.885    1771.661255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  232106.208 1267720.634    2947.115255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  234048.362 1265368.487    1700.161255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  234488.151 1265892.044    2941.395255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  235272.553 1262161.621    1557.162255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  235806.582 1262797.370    2990.014255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  237905.804 1260632.207    1645.822255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  237842.977 1260557.413    3092.974255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  239771.805 1258008.996    1594.342255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  240304.817 1258827.552    2895.635255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  242544.323 1256768.996    1597.202255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  242650.925 1256932.707    3010.034255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  244816.950 1254761.305    1597.202255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  245323.312 1255538.934    2987.154255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  247561.300 1253419.460    1508.542255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  247929.165 1254053.003    3078.674255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  249300.684 1250440.586    1648.681255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  249815.695 1251327.546    2992.874255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  251414.399 1249155.048    1545.722255   0 255  1 1CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
  251813.197 1249584.524    2864.175255   0 255  1 3CLASS_MainFault_Nrm_01    UNKNOWN    CLASSTIME    PSW_Paradise_3d    feet    ms
ahapclap21{jobradovic}%
```

An enlarged, detailed view is shown below.




Source (3D survey)
Distance Unit
Domain Unit
Version
Interpreter
Domain

Data Import/Export Wizard

Data Import/Export Wizard allows you to import and export map data as well as other data types into and out of an OpenWorks project. Data Export Wizard allows you to export the data from a project to a file.

Data Import/Export Wizard supports many data types. In the 2D data loading portion of the class, Data Import Wizard was used to import 2D seismic navigation data from ASCII files.

Faults are also among the supported data types for this wizard.

Data Import/Export Wizard allows you to do the following with data in an OpenWorks instance:

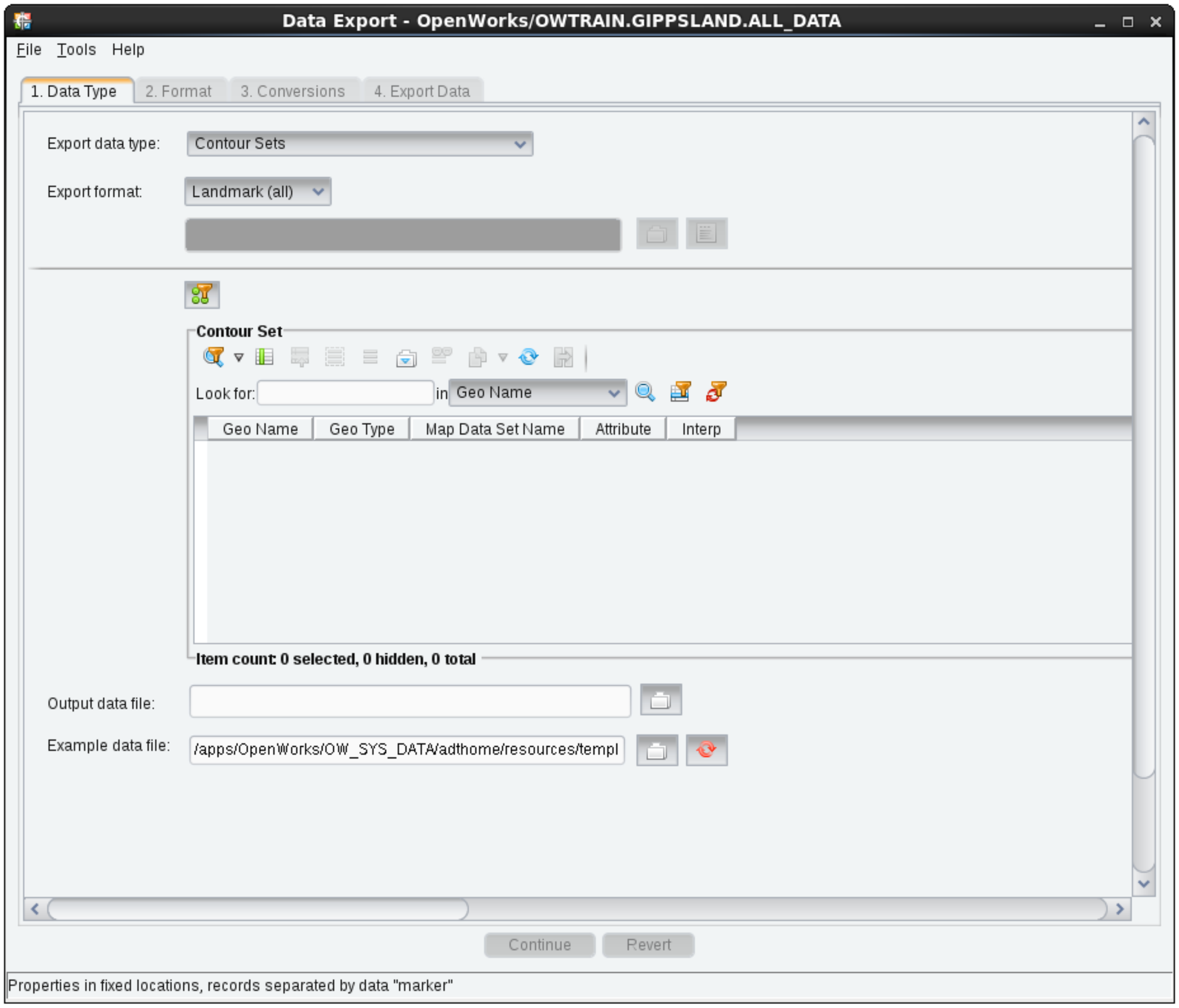
- Import data from a file in ASCII format into an OpenWorks project
- Export data, depending on the type of data, to a file in one of several formats: standard (an OpenWorks format), custom, GXF, or Z-MAP Plus format
- Select or interactively create a format file describing a data file
- Preview importing data
- Allows a command line interface for third party applications

To start Data Import and Export Wizards, from the OpenWorks command menu, select one of the following:

- Data Export Wizard: Select **Data > Export > Data Export**
- Data Import: Select **Data > Import > Data Import**

Data Export Wizard Example - Export Fault Data

1. Open the wizard from the OpenWorks command menu by selecting **Data > Export > Data Export**.

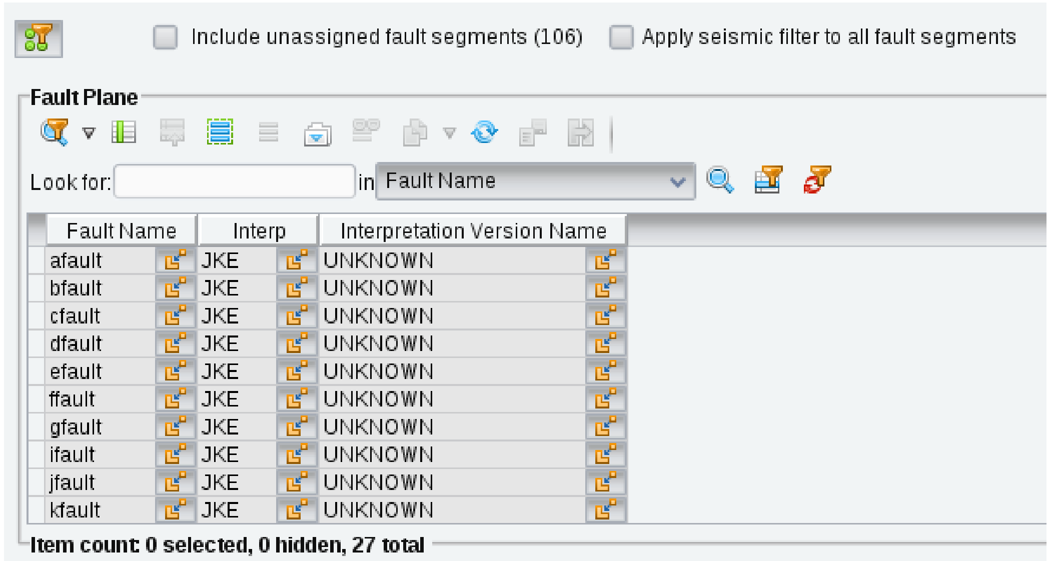


Data Type tab

In the **Data Type** tab, select the type of data to export, select the data you want to export from the list, specify an output file name and format file choice.

2. To export fault data, select **Fault** from the **Export Data Type** drop-down list.

The faults in the OpenWorks project display in the Fault Plane window.



The list of file may be rather large. A simple filter is available to help you find the fault data you want to export.

3. Use the **Simple Filter** function to show filtered data in the table:

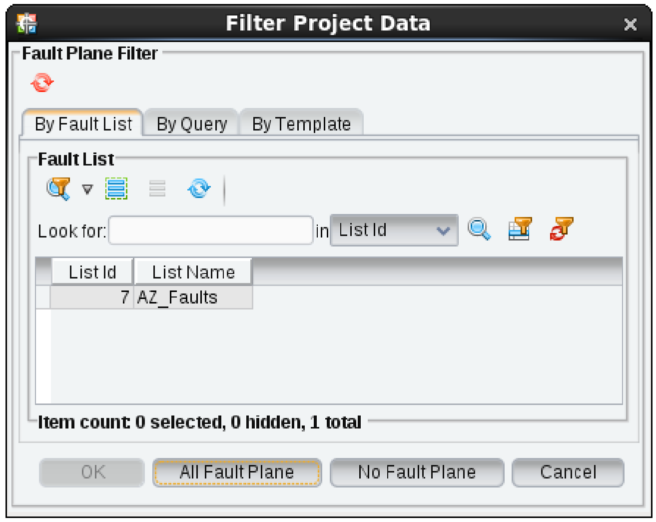
   a. Enter text in the **Look for** text box.

   b. Select a column name from the **in** drop-down list.

   c. Click the **Search** icon ( ) to select data that fits the criteria, or click the **Filter** icon ( ) to remove data from the table that does not fit the criteria. The **Reset** icon ( ) returns the table to its original form.

   d. If you have a fault list available, you may use the filter to select only the required fault lists.

e. To select a fault list, click the **Optional Filter** icon () and select a fault list from the **Filter Project Data** window.



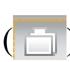
Fault export options:

- **Include unassigned fault segments**: This option is cleared by default, and no unassigned fault segments are exported. You may select the check box to export all unassigned fault segments in the project. The number within the parenthesis indicates how many unassigned fault segments are in the project.

- **Apply seismic filter to all fault segments**: This option is cleared by default, and the fault segments (assigned or unassigned) are exported without regard for which 2D line or 3D survey the fault may be associated with.

Export Format Options:

4. Select the format of the data file from the **Export Format** list. If you selected **Custom** from the **Export Format** list, do the following:

5. Click the **Browse** button to select the export format (). The *Select File* window displays.

6. Select the format file for the data type you have selected and click the **Open** button.

The pathname of the file appears in the text box below the drop-down list.

7. If you want to look at the content of the format file, click the **View Selected Format** icon ( ).
   A window displays with the contents of the format file.

8. Click the **Close** button to exit.

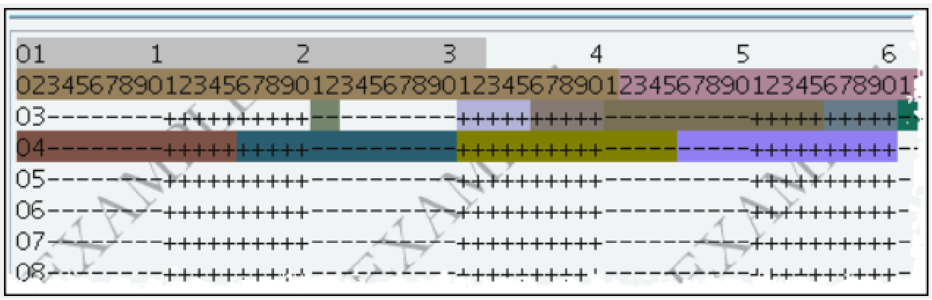
9. Enter the pathname of the export file in the **Output Data File** field, or click the **Select an Export Data File** icon to select a path.

10. In the **Example Data File** field, enter the pathname of the file that is used as a background for the data in the **Format** tab.

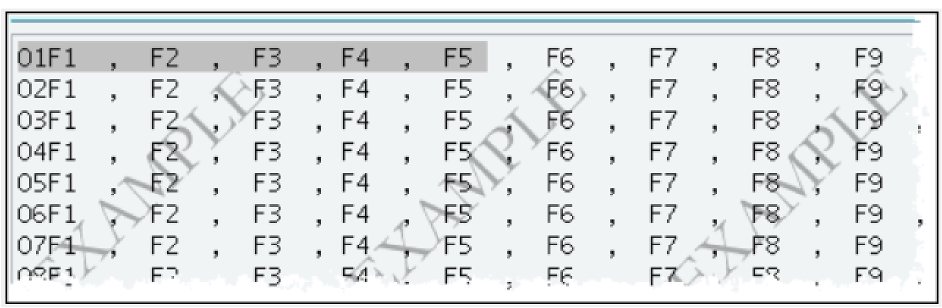
    Two files are provided in the GeoDataLoad™ software: **template.dat** and **delimitedTemplate.dat**. They are located at:

    ```
    $OWHOME/GeoDataLoad/adthome/resources
    ```

- **template.dat**: for fixed width data fields.



- **delimitedTemplate.dat**: for data fields delimited by a character.



11. Once all the exportable faults are selected, click the **Next** button in the wizard panel to proceed.

Format tab

The **Format** tab allows you to connect each data item of the data type to a field in an output data file and determine for some data items whether they will be exported.

The general work flow for the **Format** tab is:

1. If needed, add categories (child data types) to the **Data Categories** tree.
   Most data types display all of the needed categories and child categories, but if you are creating a new format for the data file, Horizons, Microseismic Jobs, and Microseismic Treatment Data may need other data categories.

2. From the **File Layout** sub tab, define the layout of the data file.

3. Select the **File Section** sub tab.

4. For each category in the Data Categories tree that has more than one data item of that type in the data file:

   - In the **Data Categories** tree, select the category.

   - In the **File Section** sub tab, configure the sub tab for the category.

5. Select the **Data Items** sub tab.

6. For each category in the **Data Categories** tree:

   - In the Data Categories tree, select the category.

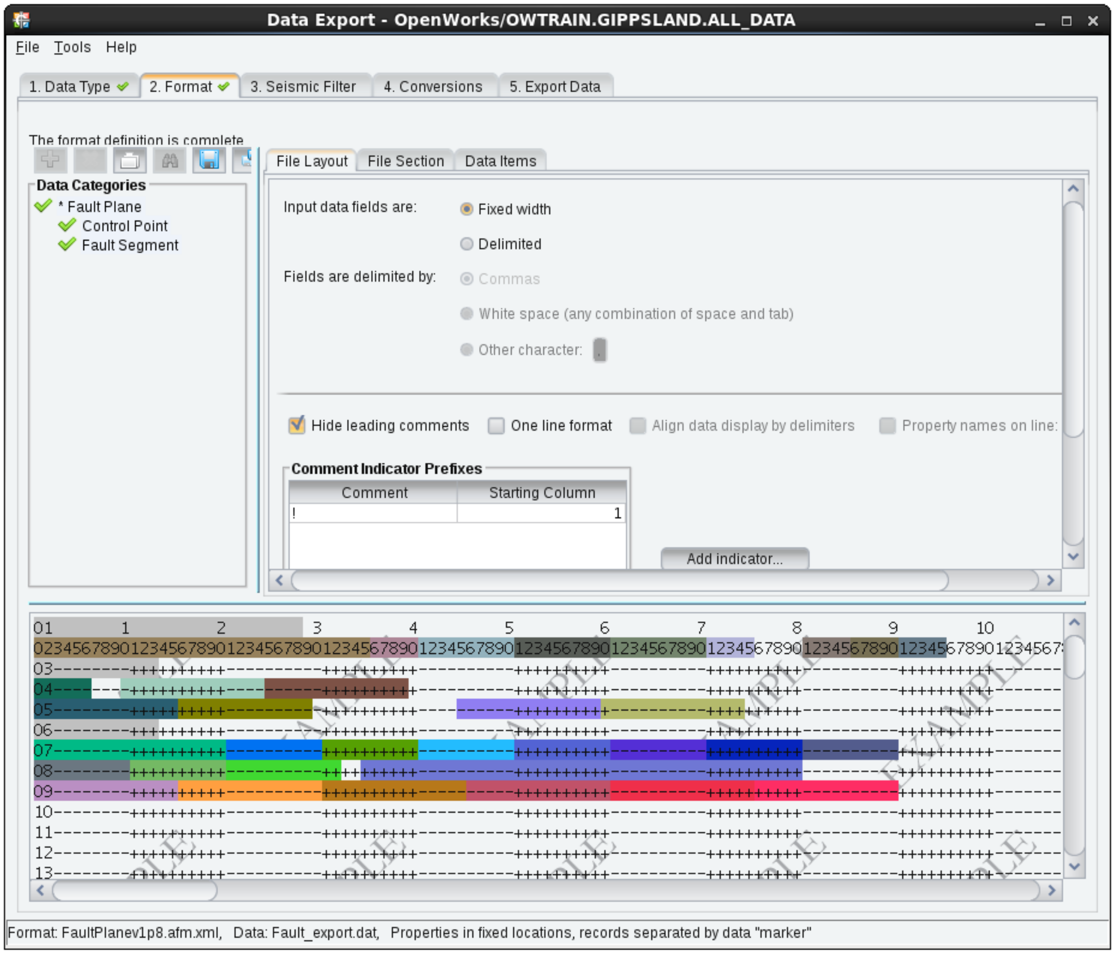
   - Configure the required data items (with an asterisk).

   - Configure other data items that are in the data file that you want to export from the OpenWorks project.

   When the data categories are properly configured for the format of the data file, a green check mark () appears near the name of the category.

   Starting Number: In configuring a data item for a data file, you must provide a location of the value in the data file. When counting lines, columns, or fields in the data file, the numbering starts with one, not zero.

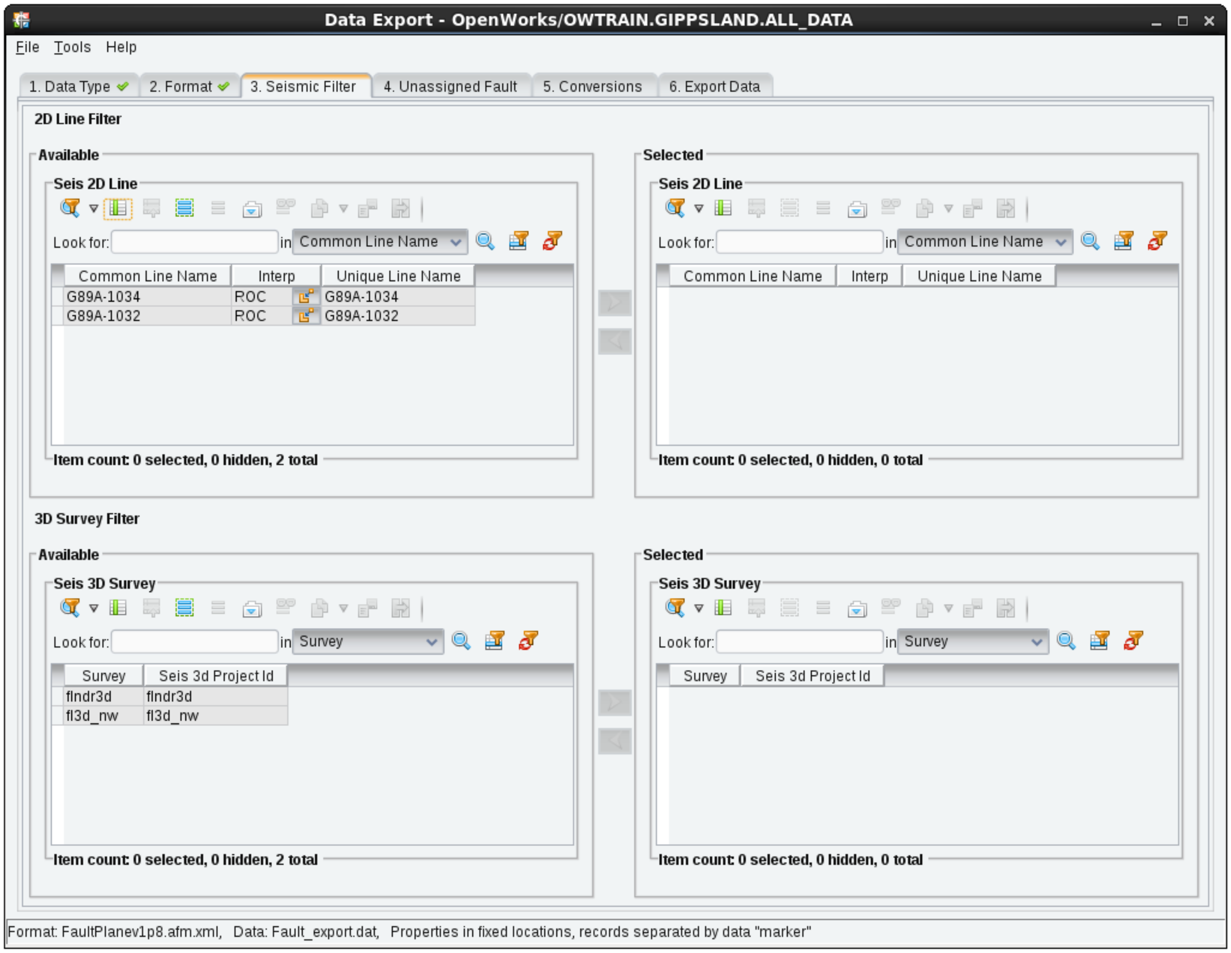
7. After all the data categories are configured and a green check mark ( ) appears in the title of the **Format** tab, select the **Seismic Filter** tab.



Seismic Filter tab

If you have selected the **faults** data type, and if you have selected the **Apply seismic filter to all fault segments** check box in the **Data Type** tab, the Seismic Filter panel will display in the right pane.

Select to filter the fault segments based on the 2D lines and 3D surveys, this Seismic Filter panel is shown below.

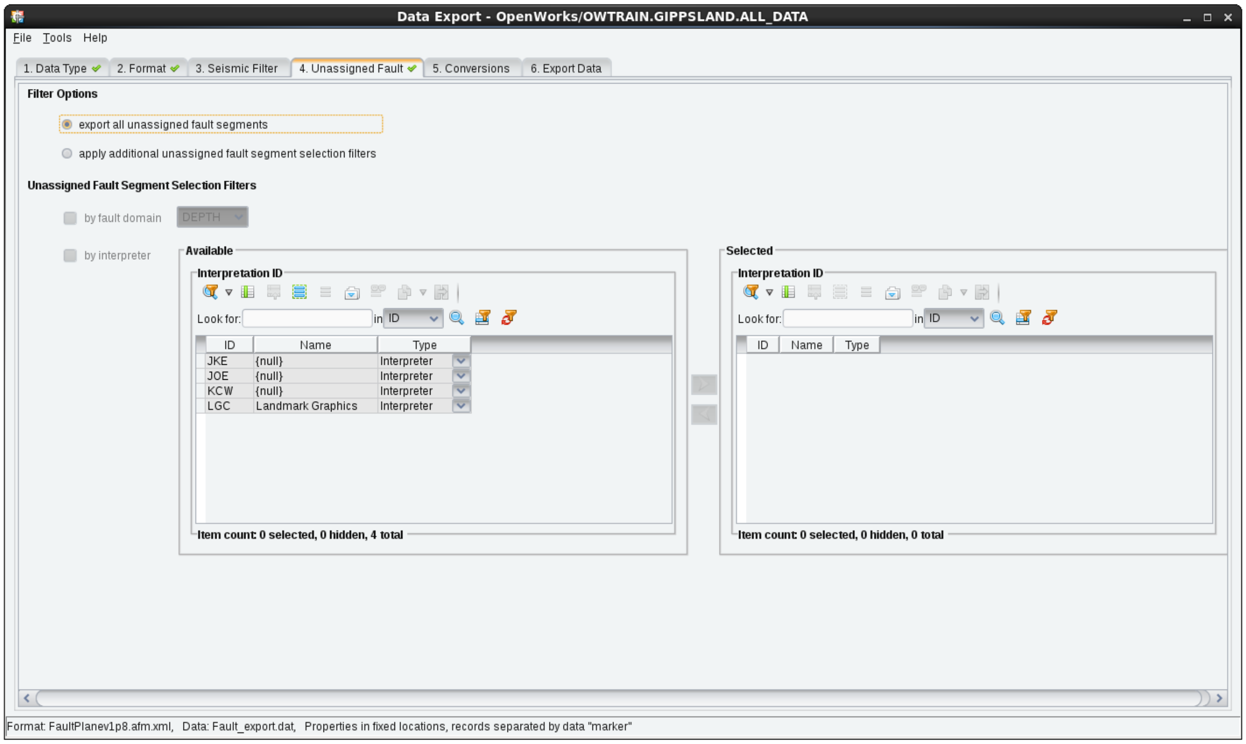


Select the **Unassigned Fault** tab.

Unassigned Fault tab

If the **faults** data type on the **Data Type** tab in Data Export was selected, and if the **Include Unassigned Fault Segments** check box was selected, the **Unassigned Fault** tab displays in Data Export.

This tab allows you to select an unassigned fault segment based on its domain (time or depth) or by the interpretation ID associated with it.



You can export all unassigned fault segments or apply additional unassigned fault segment filters by selecting the appropriate radio button.

Options for the additional filter are:

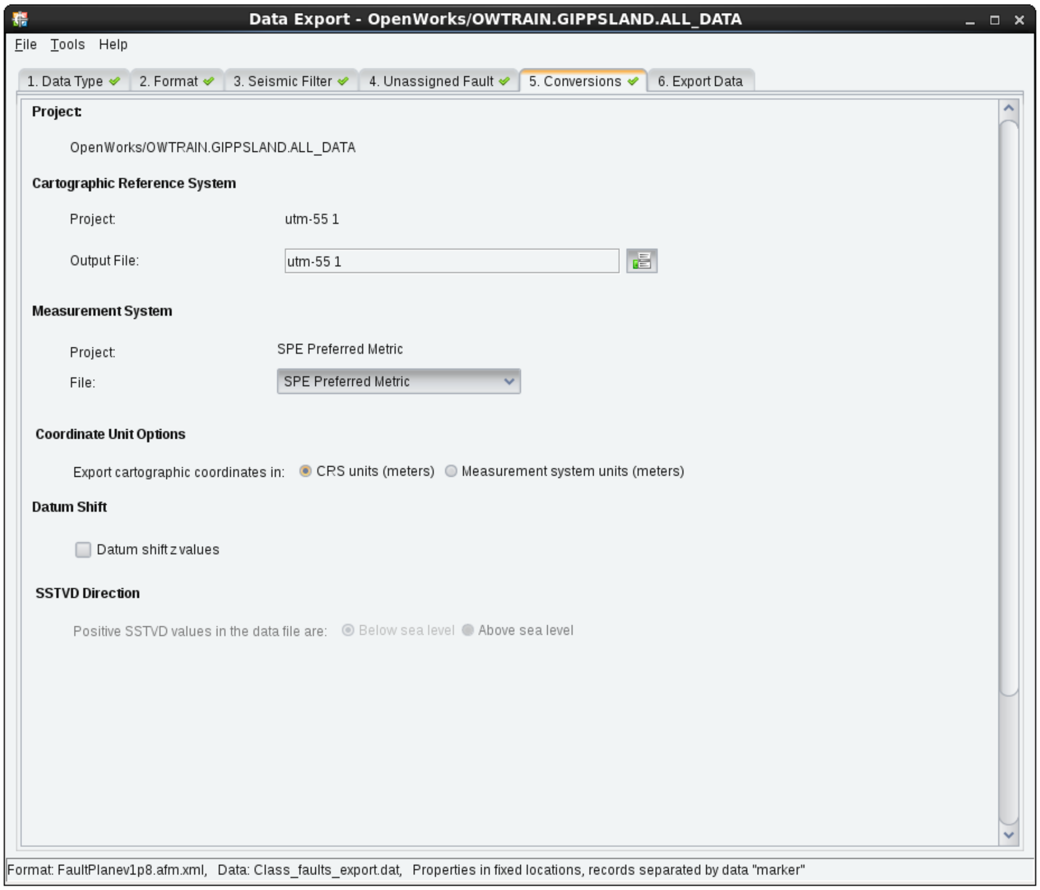
- Domain - choose TIME or DEPTH
- Interpretation ID - select the Interpretation ID(s) from the Available list for the faults you want to export and click the arrow to move them to the *Selected* list

In the Input Data Selection panel there is some more information you need to supply.

Select the **Conversions** tab.

Conversions tab

The **Conversion** tab allows you to inform the Data Export tool about some characteristics about the data in the data file. When the data is exported from the OpenWorks project, the data is correctly converted when placed in the file.



Source Project - An informational statement about where the project data comes from. If the project is incorrect, it is best to close the Data Export tool, select the correct project in Project Status, and then restart the Data Export tool.

Cartographic Reference System - If the name of the coordinate reference system (CRS) of the data is not displayed in the Output File text box, do the following:

- Click the **Select CRS** button.
  The *Select Coordinate System* dialog box displays.

- Select a CRS.

- If a CRS for the data does not exist in the lists of the CRSs in the project, click the **Create** button to open the **Map Projection** Editor.
- Click **OK**.
  The *Select Coordinate System* dialog box closes.

Datum Shift - When exporting data such as horizons, this section appears in the Conversions tab. When the **Datum Shift Z Values** check box is selected, and if in the Cartographic Reference System section above, the datum is different between the two CRSs (the ones referenced in Project message line and in the Output File text box), the z-values of the coordinates of the data will be shifted in accord with the change in datum when the data is exported. If unchecked, the z-values are not shifted when the data is exported. As a default, the **Datum Shift Z Values** check box is selected, and the data is shifted.

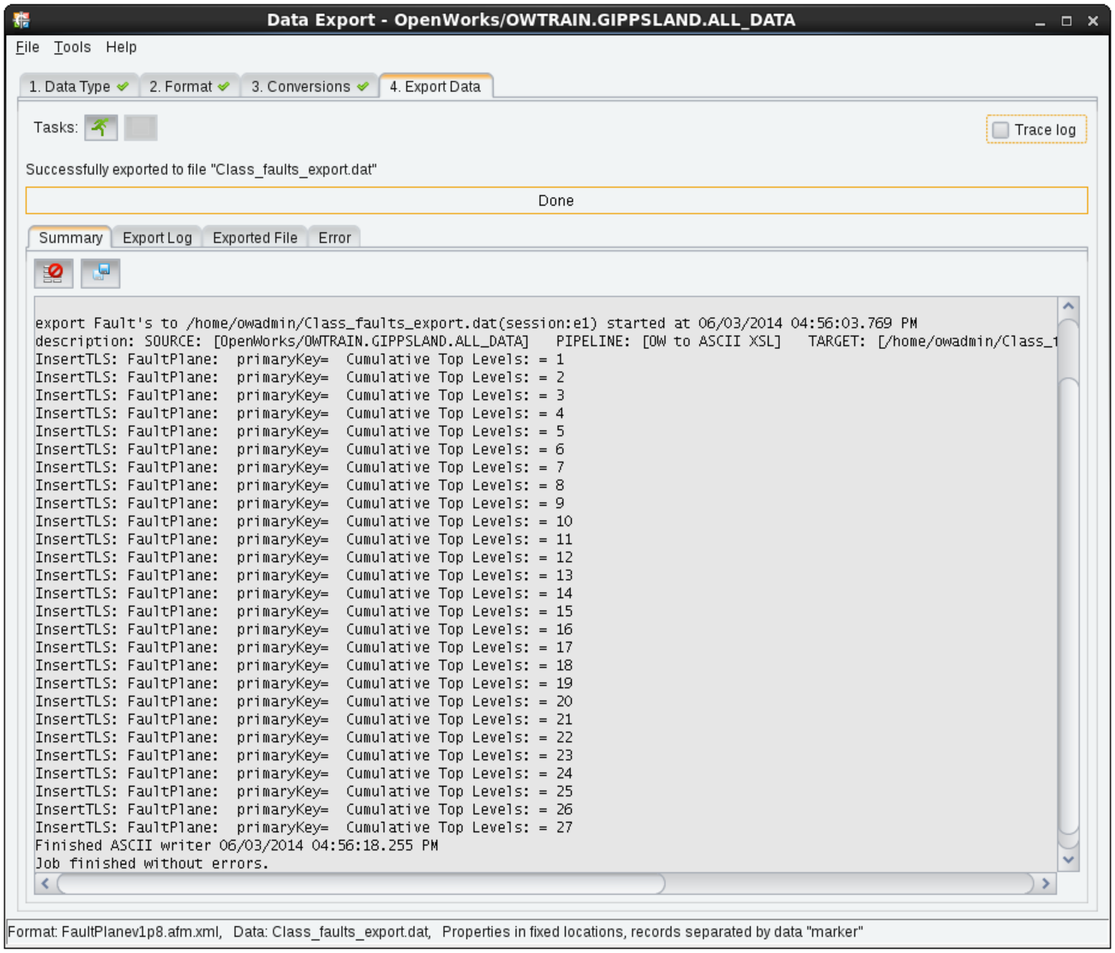
Coordinate Unit Options - For measurement system units, select the units configured in the CRS or the units in the measurement system currently selected in Data Export. The default measurement system in Data Export is the one selected in the OpenWorks session. However, in the Measurement System section below, you may change the measurement system to another one configured in your OpenWorks project.

SSTVD Direction - Select the **Positive Numbers** or **Negative Numbers** radio button, depending on whether the subsea true vertical depth (SSTVD) measurements are positive or negative values when the measurement is below sea level. The default is Positive Numbers.

Measurement System - In the **File** drop-down list, select a measurement system that characterizes the data for the file. Make any changes necessary and select the **Export Data** tab.

Export Data tab

Click () to export the file. Once the export process has started, a **Stop the current job** button becomes available, should you need to stop the export.



When the job is finished, you can view export information in the following tabs:

- **Summary** - information and error messages from the export engine
- **Export log** - raw console output from the export engine

The level of the messages displayed is selectable. The **Console** drop-down list has the following items:

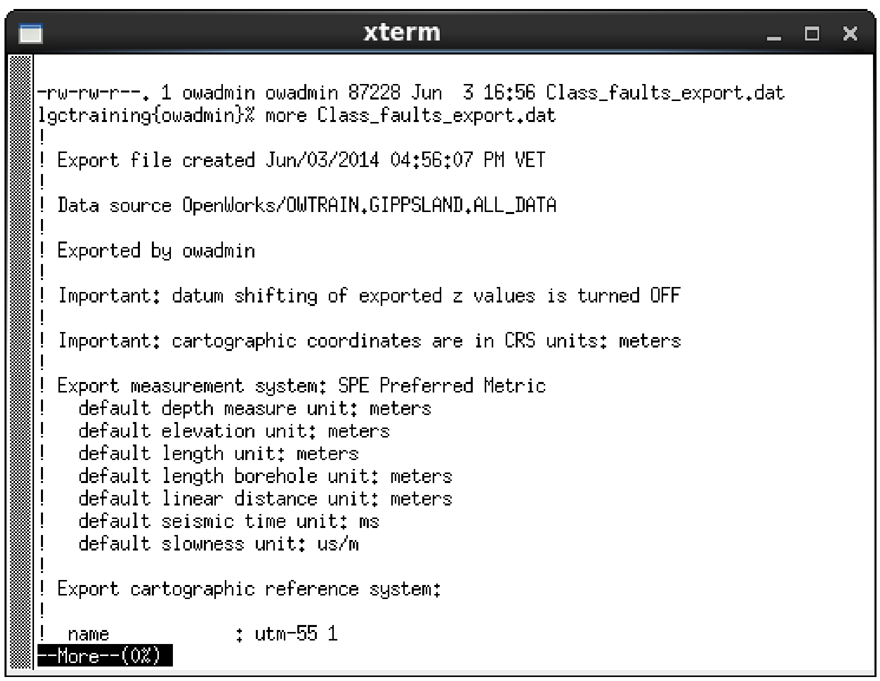
- **OFF** - No messages are sent to the display
- **SEVERE** - Only important messages (do not necessarily indicate an error conditions) are sent to the display

- **INFO** - Only INFO, WARNING and SEVERE messages are sent to the display. This item is the default setting
- **FINER** - Only FINER, FINE, CONFIG, INFO, WARNING, and SEVERE messages are sent to the display
- **ALL** - All messages from the engine are sent to the display

- **Exported File** - contains a sample of the first few hundred lines of the export file
- **Error** - contains information about error messages from the export engine

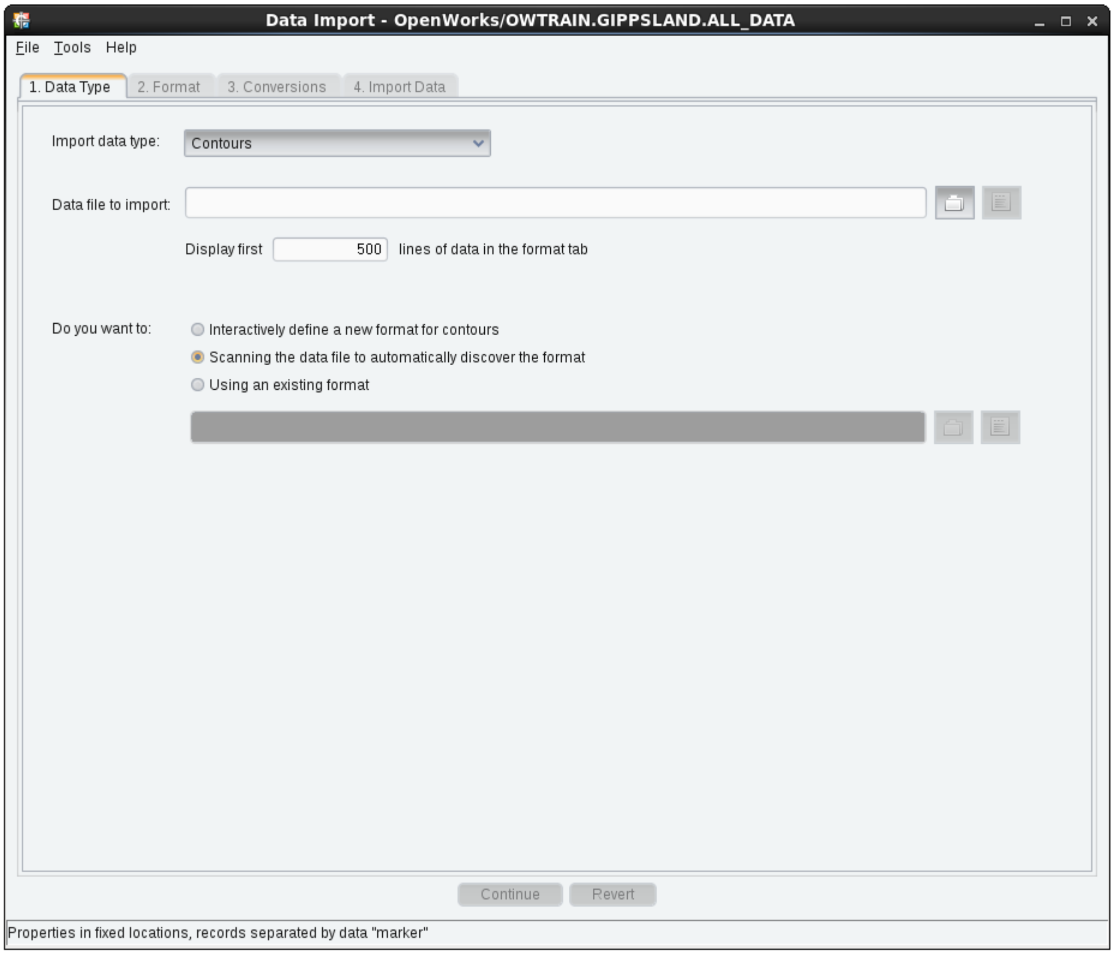
When you are finished, select **File > Exit** to close the wizard.

The export data file can be view in a terminal window using the *more* UNIX command.



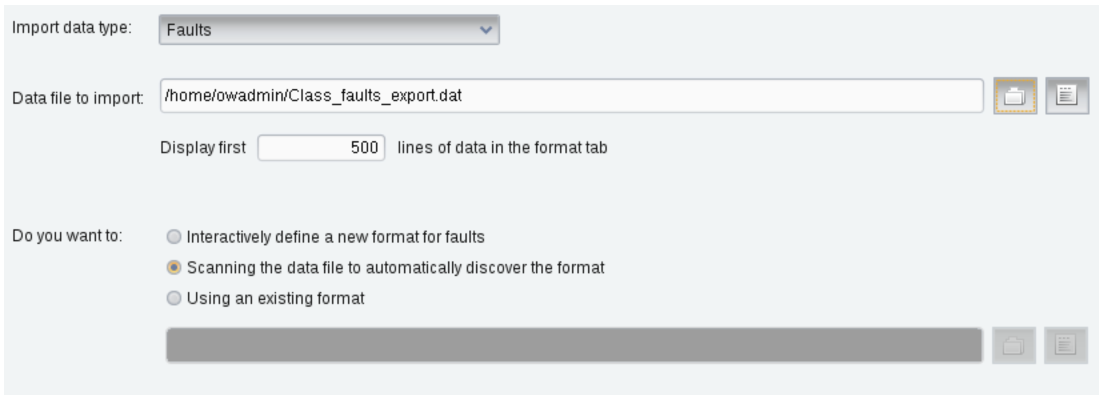
Data Import Example - Import Fault Data

Open the utility from the OpenWorks command menu by selecting **Data > Import > Data Import**. When the Data Import tool opens, it opens with the **Data Type** tab.



Data Type tab

Select *Faults* from the **Import data type** list, to import Faults into the current session or project. Click ( ) adjacent to the **Data file to import** field and select the data file to import. Also choose the format option you want to use for the import. This example uses the second option.



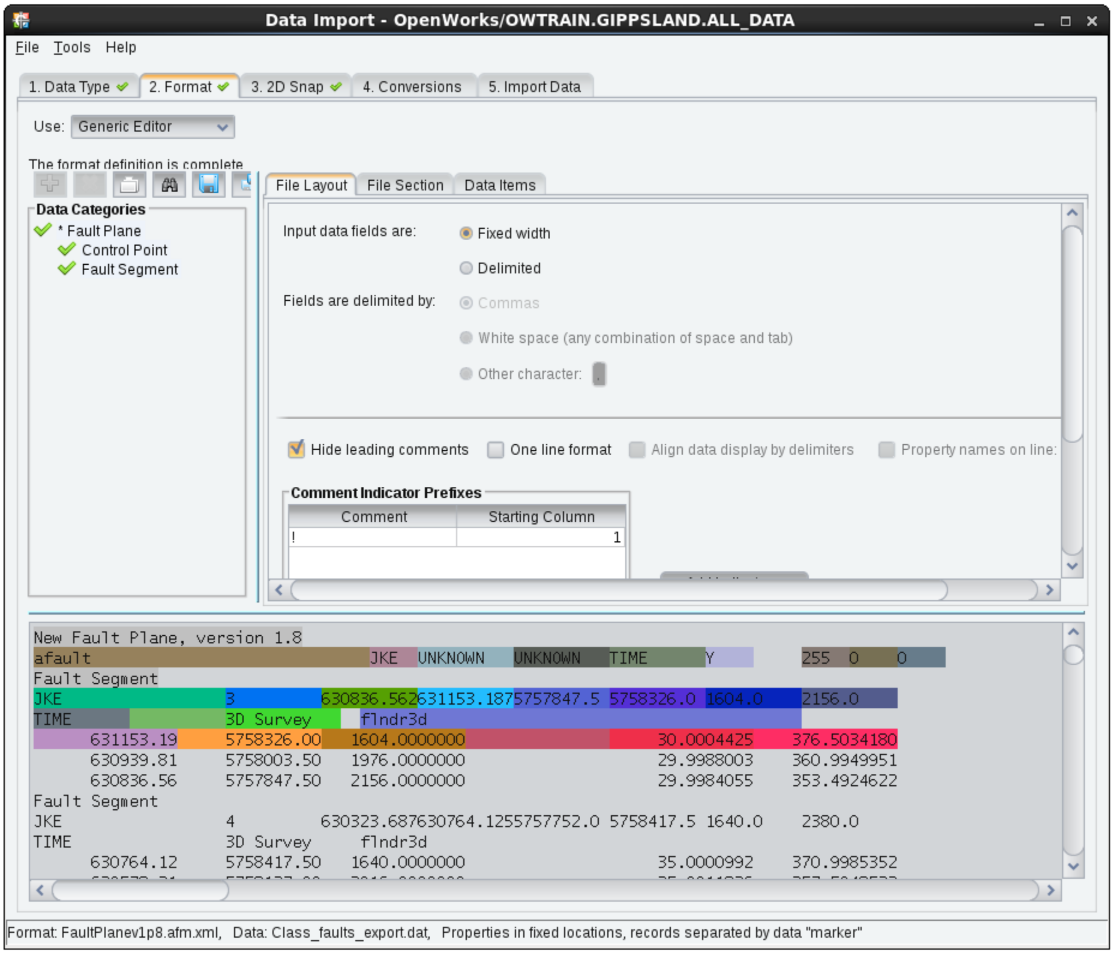
Click **Continue** to go to the Next tab.

Format tab

The **Format** tab has functions that allow you to describe the format of the data file and where Data Import can find data items to import into an OpenWorks project.

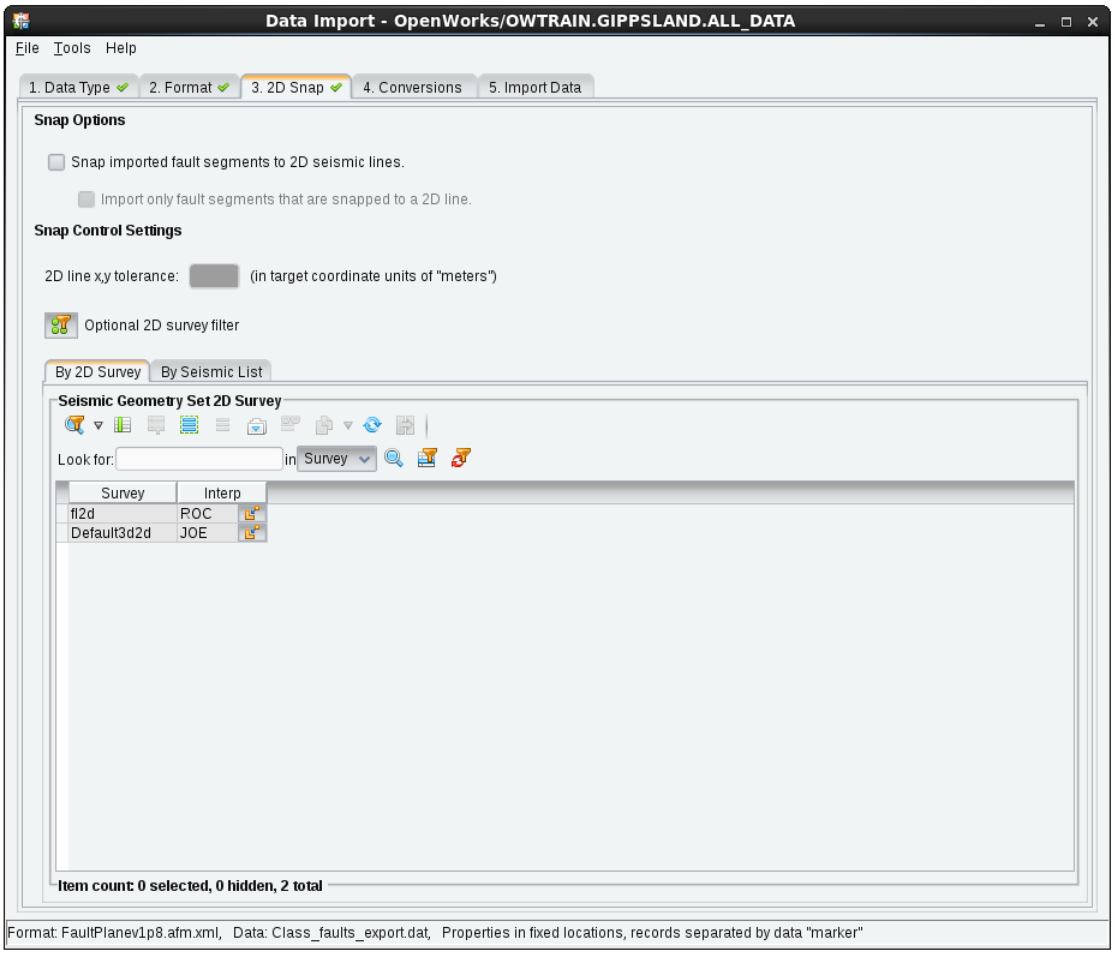
The general workflow for the **Format** tab is the same used in the above procedure for the Export Wizard.

After all the data categories are configured, and a green check mark (✔) appears in the title of the **Format** tab, continue with the next tab.



2D Snap tab

When importing fault segments, the **2D Line** tab allows you to determine whether an imported fault will be repositioned so that it is in alignment with (snapped to) a 2D line, and to determine whether Data Import should only import faults that are aligned with 2D lines. Data Import will align a fault with a line when every point in the fault is within a certain distance (tolerance) of the points in a 2D line.



The 2D Snap panel allows you to determine whether:

- An imported fault will be repositioned so that it is in alignment with (snapped to) a 2D line
- The wizard should only import faults that are aligned with 2D lines

The wizard will align a fault with a line when every point in the fault is within a distance (tolerance) of the points in a 2D line.

In the **2D line x,y tolerance** text box, specify the snap distance in the units of the project (for example, meters). This distance indicates the maximum distance a fault can be from a 2D line for the fault to be snapped to the 2D line. Every point of the fault must be within the tolerance for the wizard to snap the fault to the line. Select at least one 2D survey or seismic line list in the tabs in the Snap Control Settings pane.

To filter which surveys or lists are displayed in the panel:

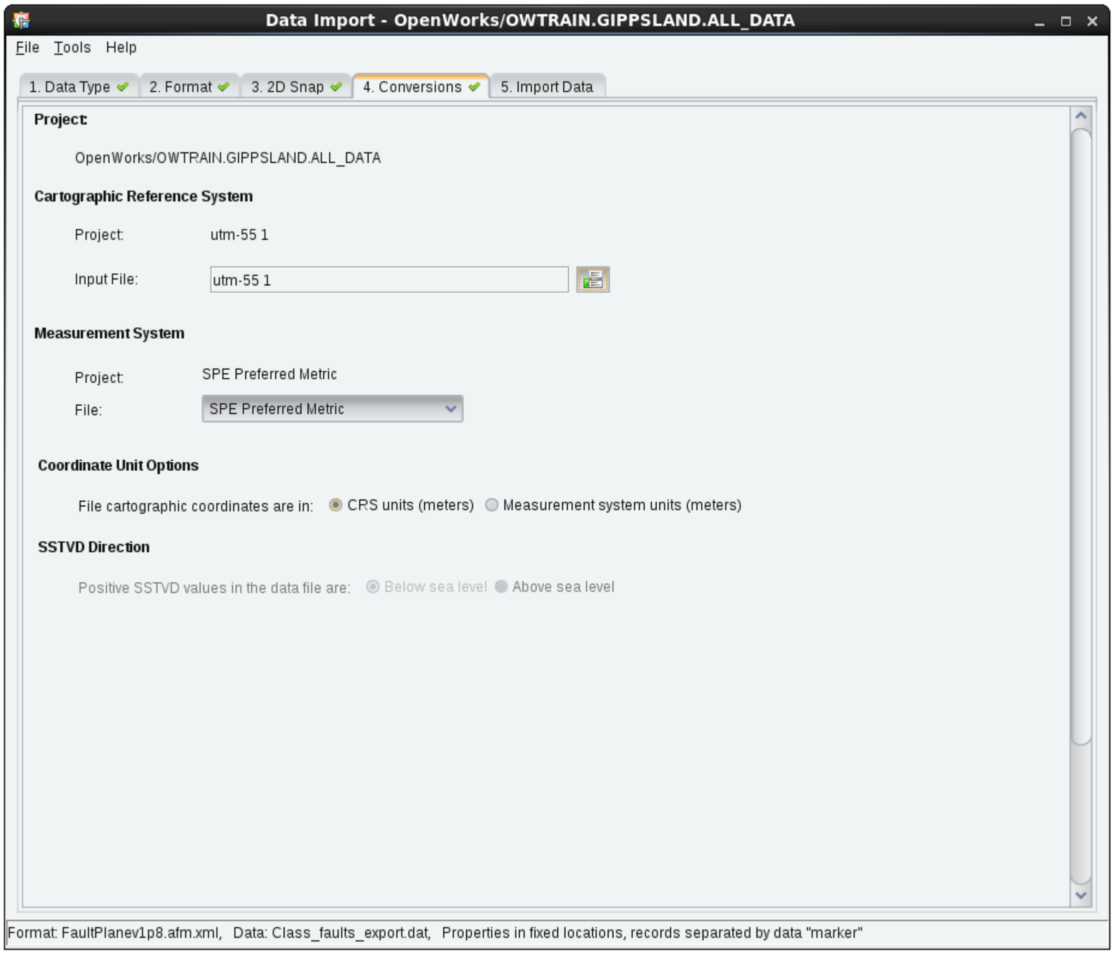
- Select the tab (**By 2D Survey** or **By Seismic List**)
- Click the **Filter** button (   )

Continue with next tab.

Conversions tab

The **Conversion** tab allows you to inform the Data Import tool about some characteristics about the data in the data file. When the data is then imported into the OpenWorks project, the data is correctly converted to similar configurations of the project.

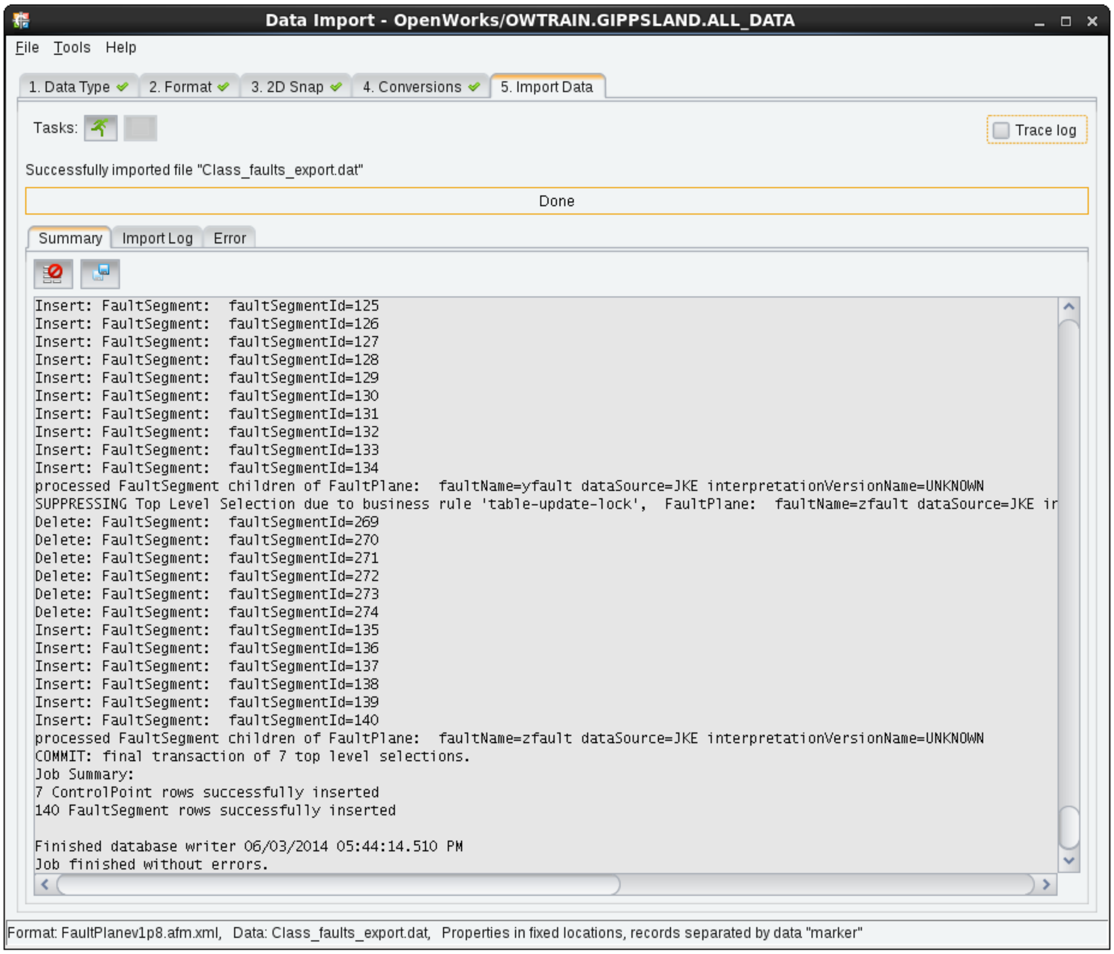
Allows you to assign a coordinate reference system (CRS) and measurement system for the data in the import file, as well as indicate which units of measure (the measurement system of the CRS or of the whole data file) are used for the coordinates in the CRS. Only grids cannot have their CRS converted.



Continue to the **Import Data** tab.

Import Data tab

The Import Data tab has the Run Import Job button that allows importing of data. Click the **Run Import Job** () button adjacent to Tasks to import the data.

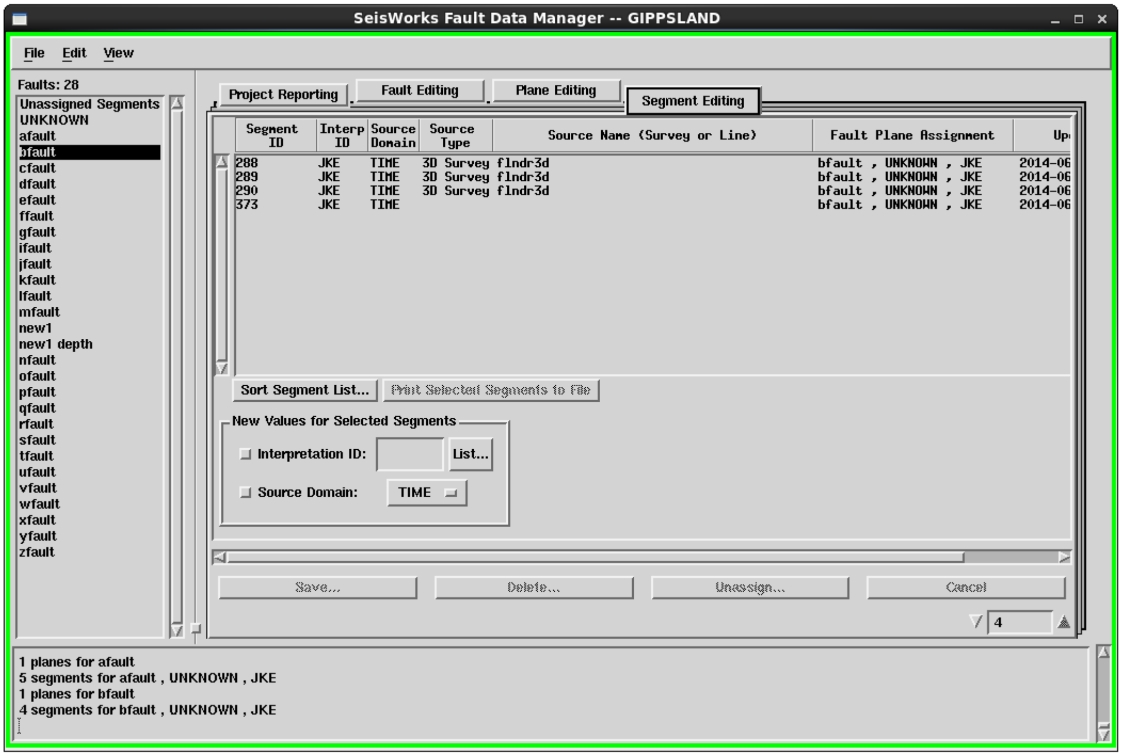


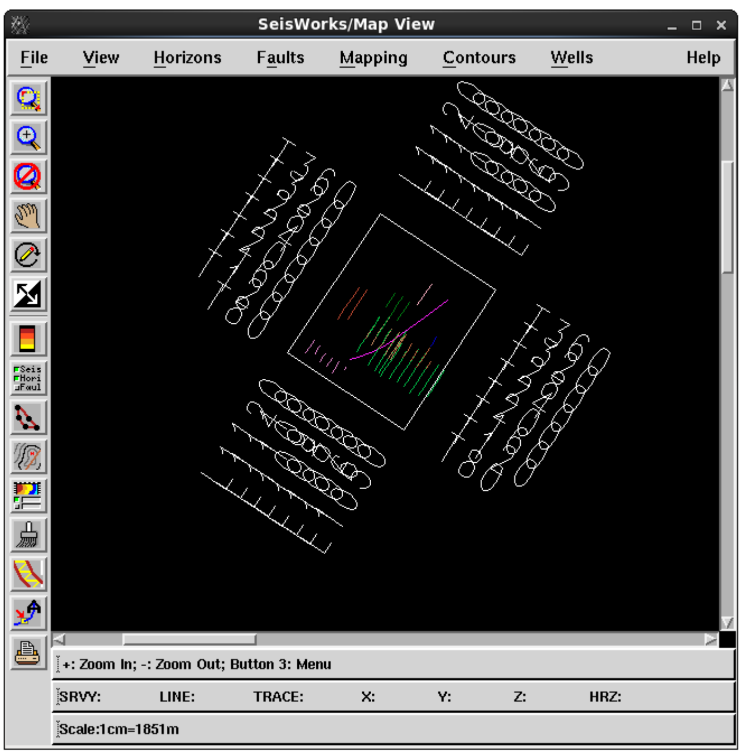
Review the information in the **Summary**, **Import Log**, and **Error** tabs.

When you are finished, select **File > Exit** to close the wizard.

You could check the Fault Data Manager in the project database to see that the faults were added. Also, you could try displaying the faults in a map view (you may need to triangulate the faults to see them in SeisWorks).

In Fault Data Manager, the imported faults can be seen in the **Segment Editing** tab.



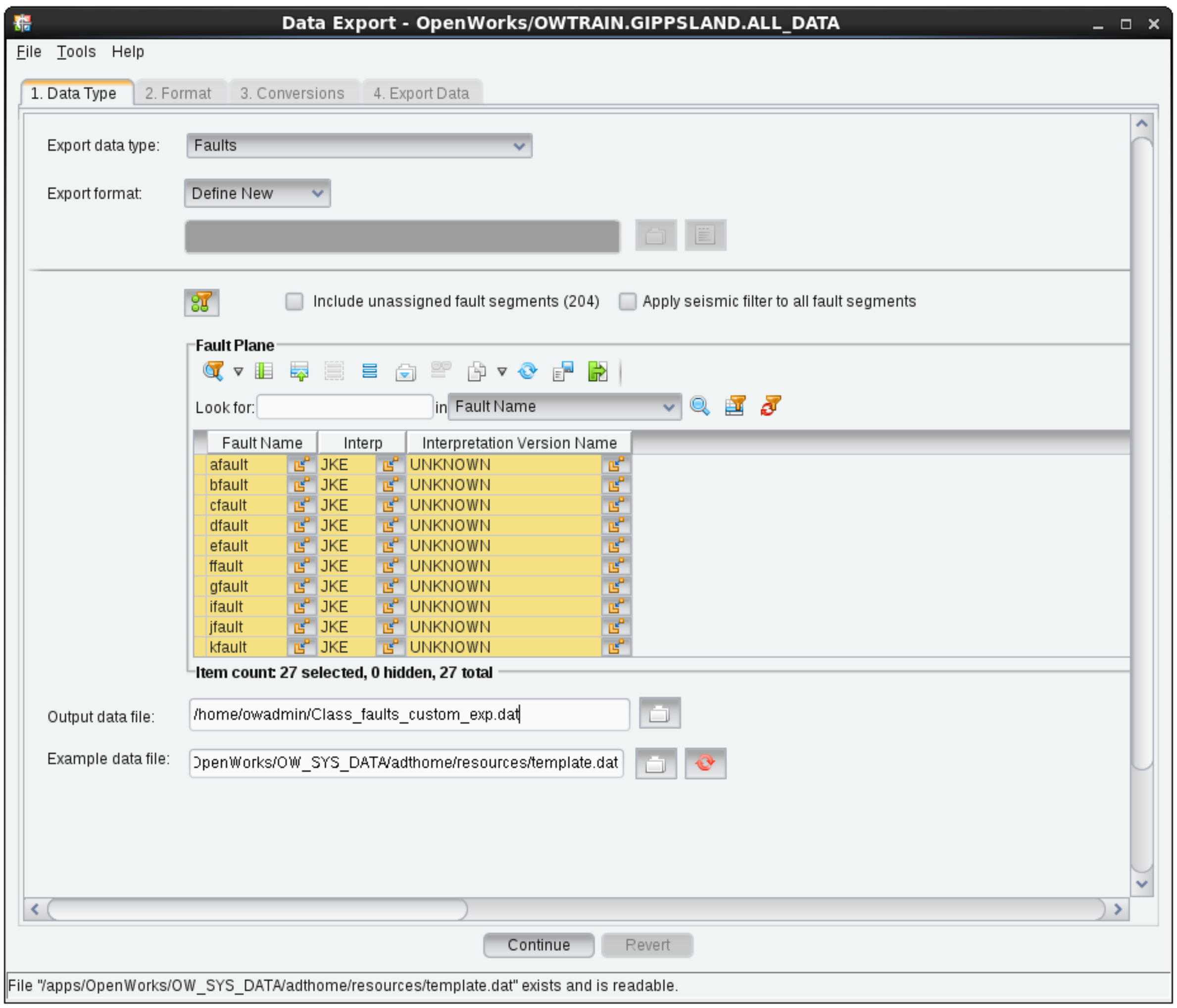


Data Export Wizard Example - Export Fault Data

Custom Export Format Example

There are times when the standard format may not meet your needs (for instance, when exporting to other software). The **Data Import/Export** Wizard allows you to define a custom format for export and import.

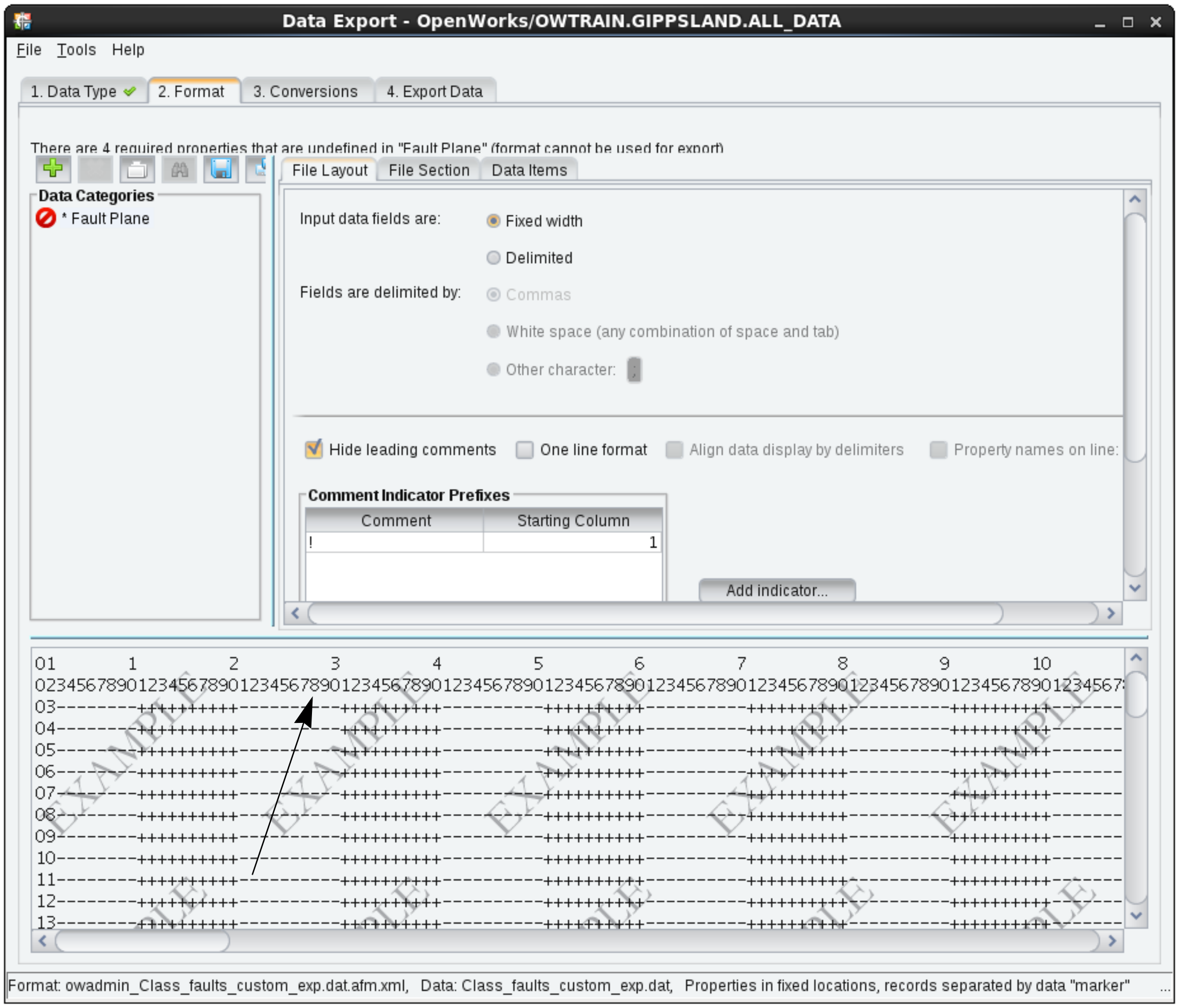
Start the **Data Export** wizard. In the **Data Type** tab, specify the **Define New** export format for the Use option.



The **Example data file** is used to help you when you are defining a custom export format.

Since there is no Input data file to display in the format editor, this option gives you a chance to pick a data file to display in the editor. It just provides a "template" data file so that the format editing process is easier.

Continue to the **Format** tab.



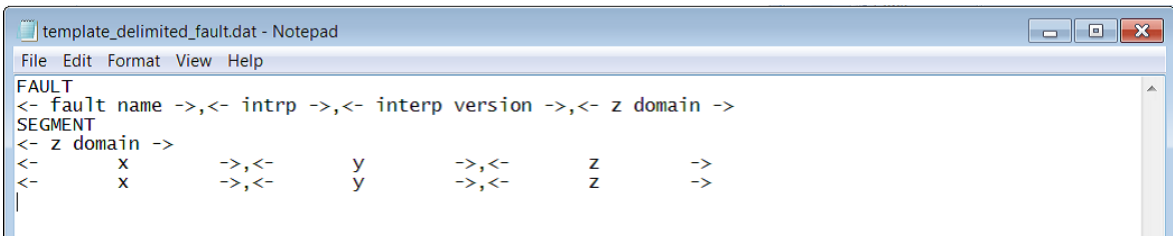
The *Sample data file* is shown here. This is the default sample data file, but you can use any file that will help you define the data fields in your preferred arrangement.

The process of creating a new custom format file is to define locations in the file where you want to place types of data stored in database tables.

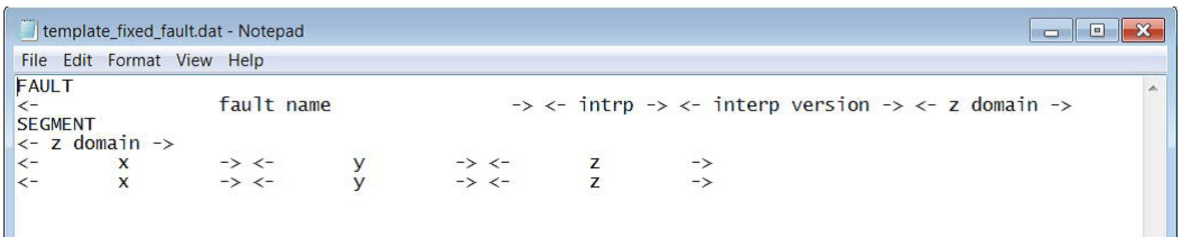
When creating a custom format, it is much easier if you to create a "template" file to use for the Sample data file that has the data types mapped out where you want them to be placed in the file.

For example, you could create a file "template" in a text editor that looks like one of the following for fault data:

Delimited Format:



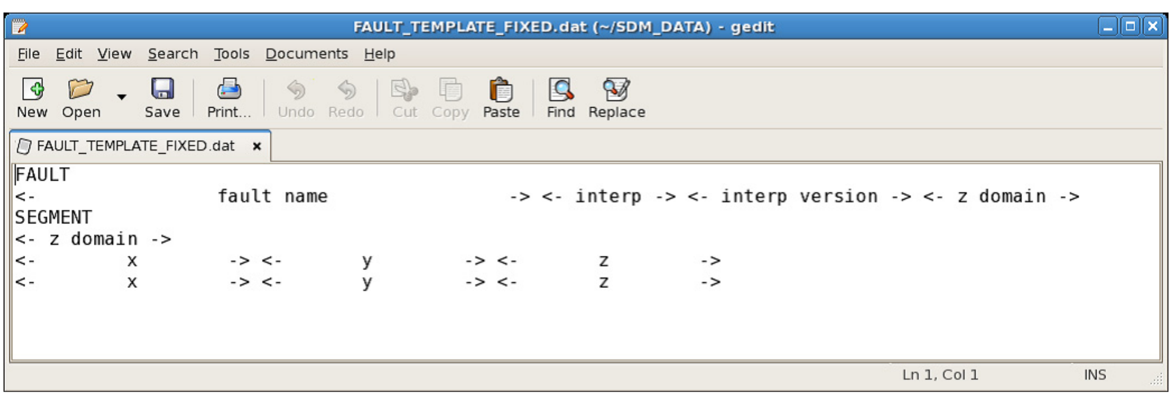
Fixed Format:



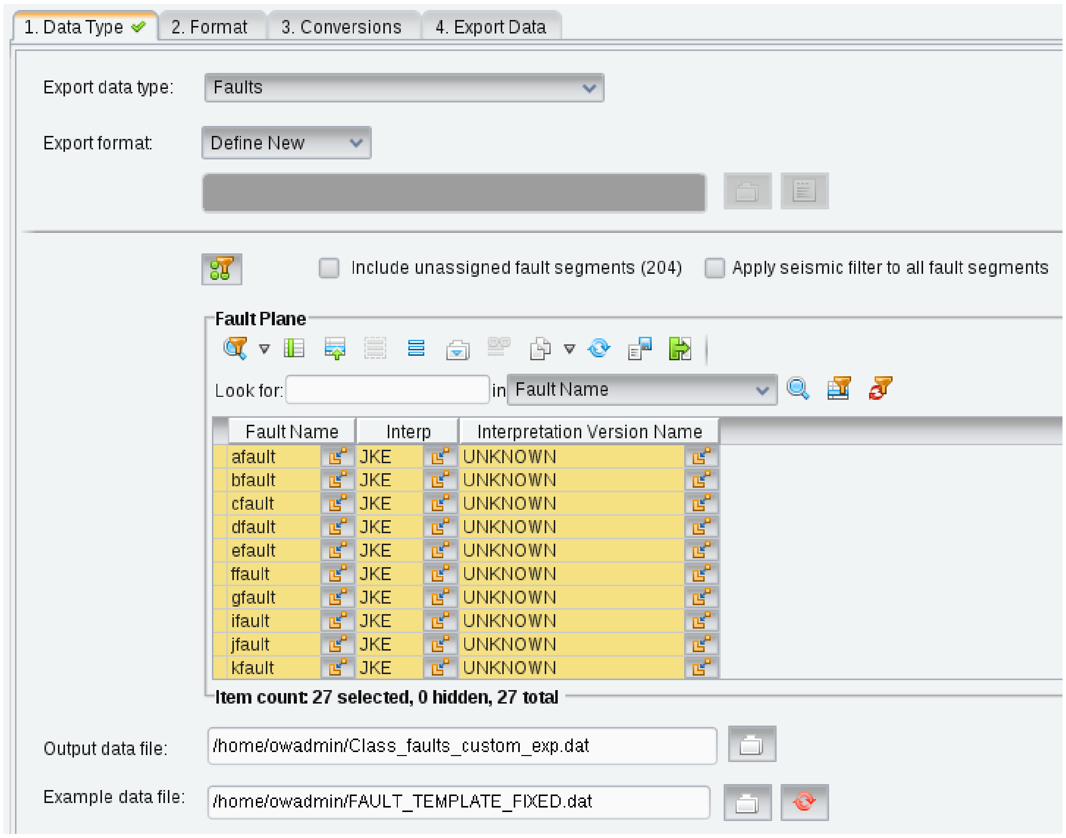
In this exercise you could use one of these sample files.

If we define the data fields you want to export and define the location of each field in the sample data file display. Here is where the "template" file would be useful.

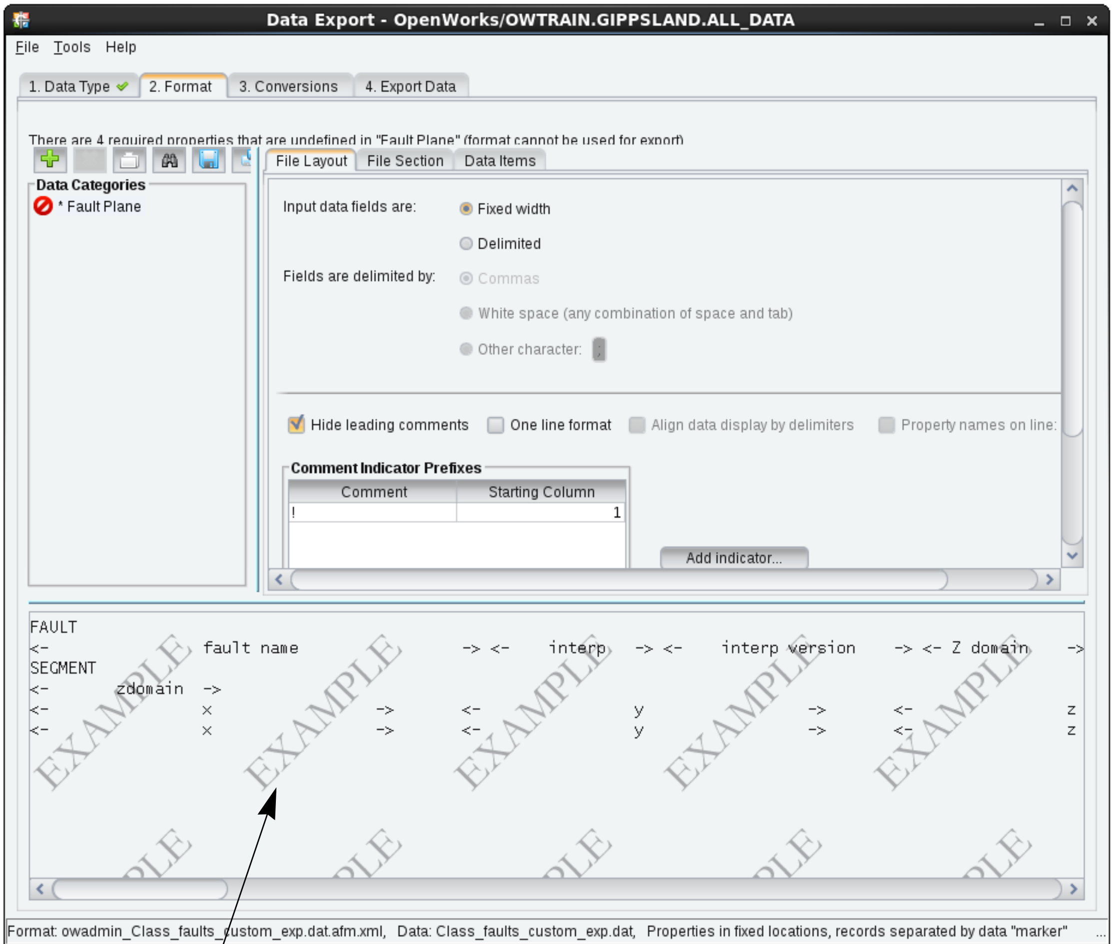
For example, using the file shown here:



After creating the template file, we need select it in the Data Type tab, as shown:



Click **Continue** button in order to select the Format tab.

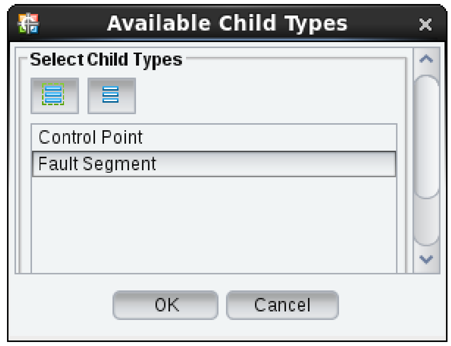


The new *Sample data file that we created is shown here. It will help you define the data fields in a user friendly manner.*

Data Categories Tree

The Data Categories tree allows you to select categories of the data type and indicate where data is located in the data file. You can also add categories that may not be listed in the tree, and configure them.

Click on **Add One Or More Child Types** () and select the **Fault Segment** and click **OK**.



File Layout Sub tab

The File Layout sub allows you to indicate to Data Export how the data is arranged in the data file.

The structure of the data fields in the file can be fixed length based on definitions you make or the fields may be delimited by commas, whitespace, or a specified character.

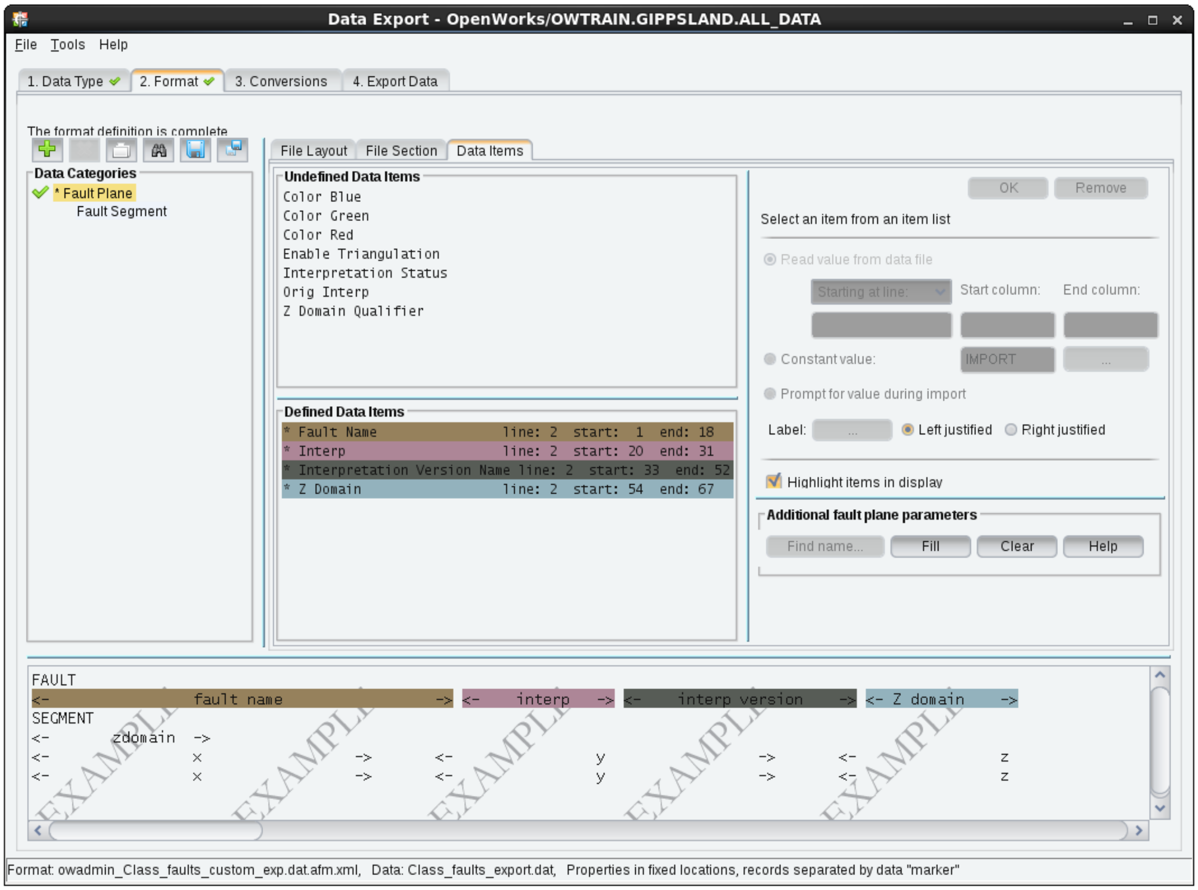
In *the Input data fields are*, toggle on *Fixed with*.

Data Items Sub tab

Select the location or value of a data type or category in the data file, and correlate the data type/category to a data item in an OpenWorks project. Each data type and category may be composed of one or more data items (or fields). Some of the data items are required. Required items have an asterisk before it and are at the top of the Undefined Data Items and Defined Data Items lists.

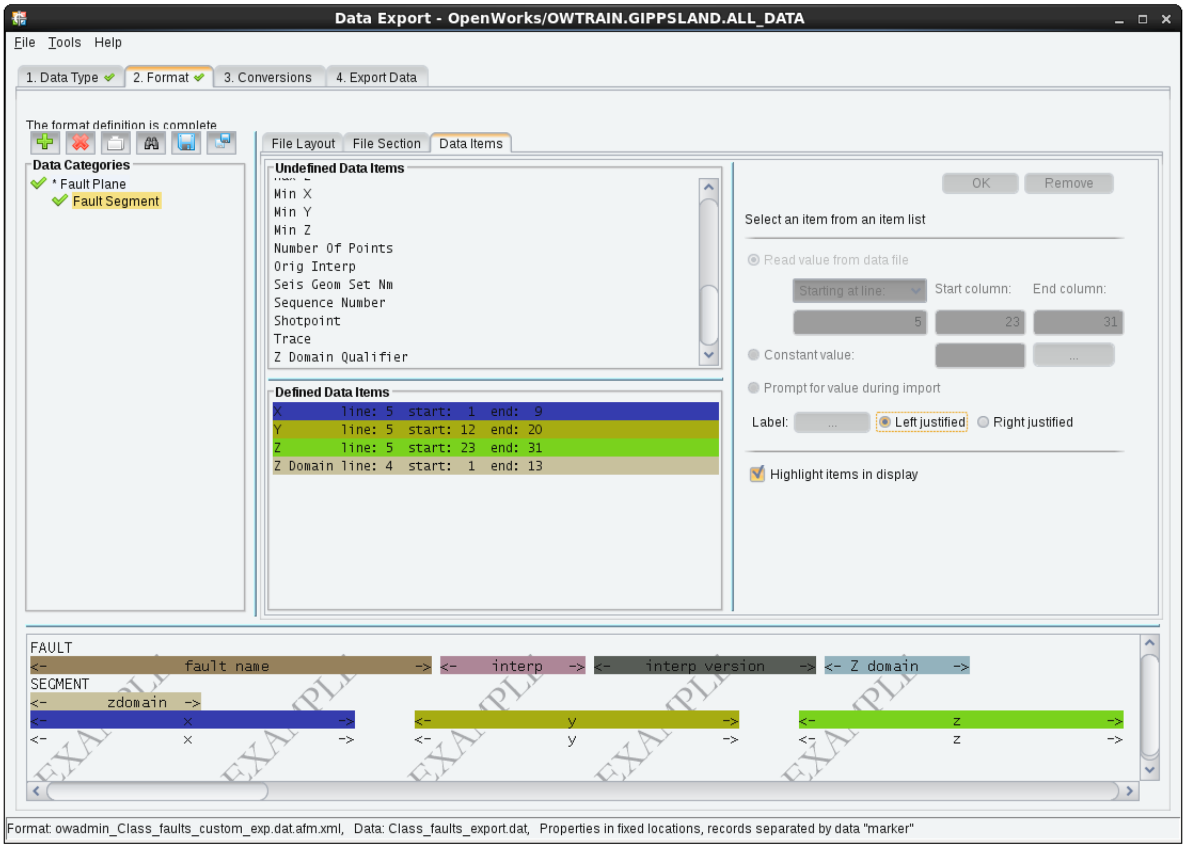
Others data items are optional. They are optional depending on whether the data file contains the data items and depending on whether you want the data in the project, even if the particular data is in the file.

Correlate each field required under Fault Plane category, as shown.



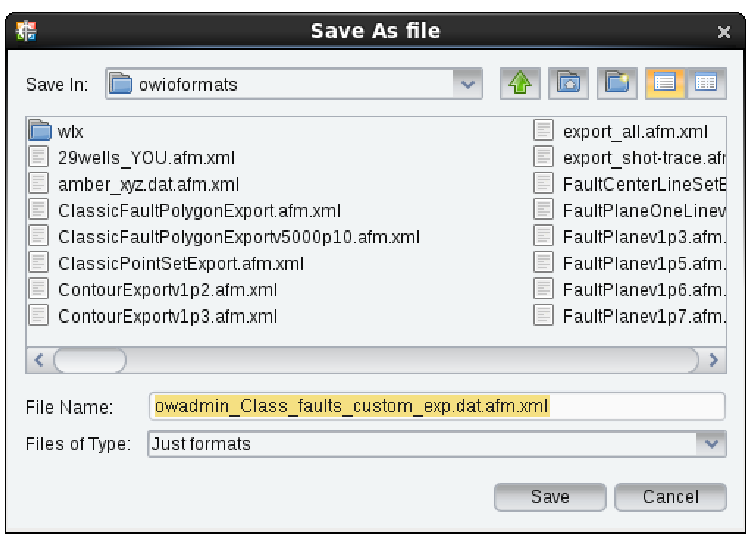
After all the data required for the category is completed, a green check mark () appears to the left of the Fault Plane category.

Now, correlate the Fault Segment category, as shown.



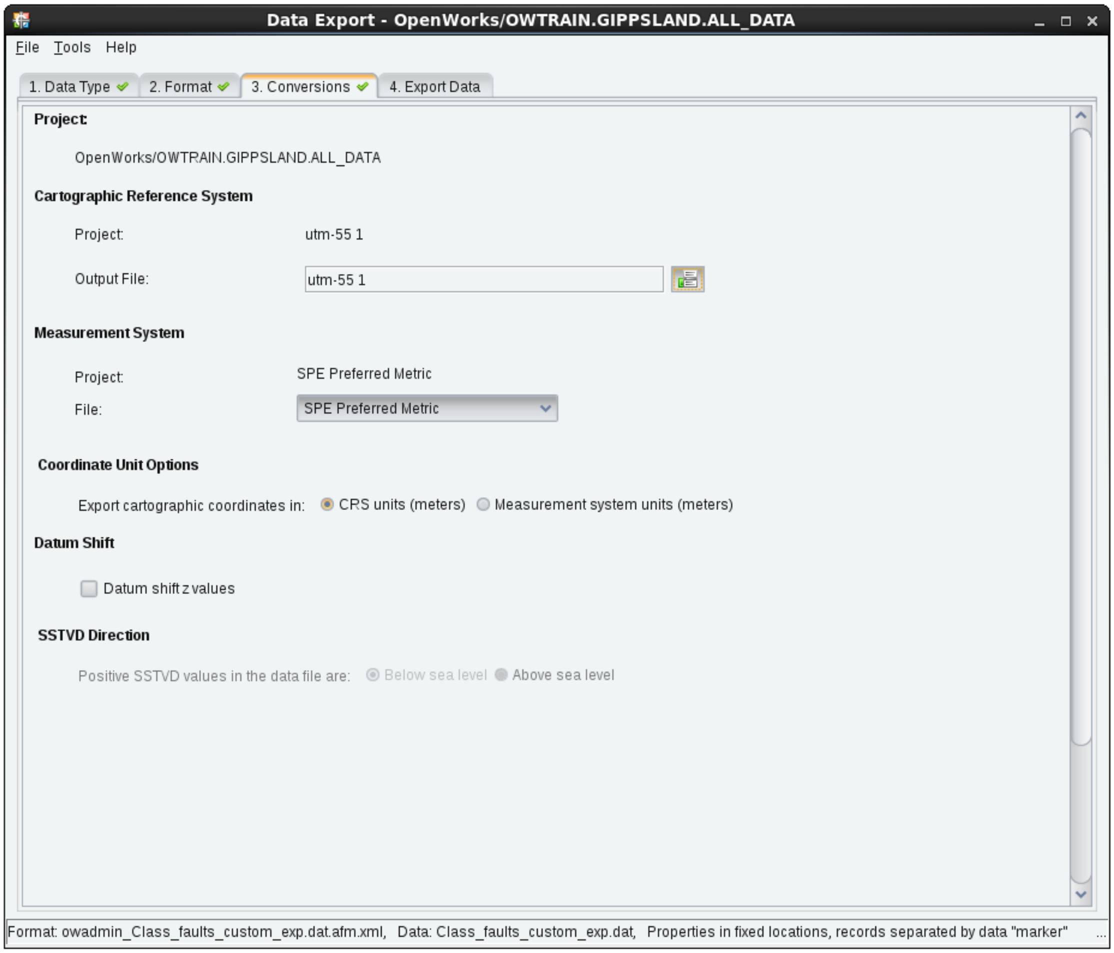
A green check mark ( ) appears to the left of the Fault Segment category as well.

8. Click the **Save As** icon ( ) and save your new custom format.



After all the data categories are configured, and a green check mark ( ) appears in the title of the Format tab.

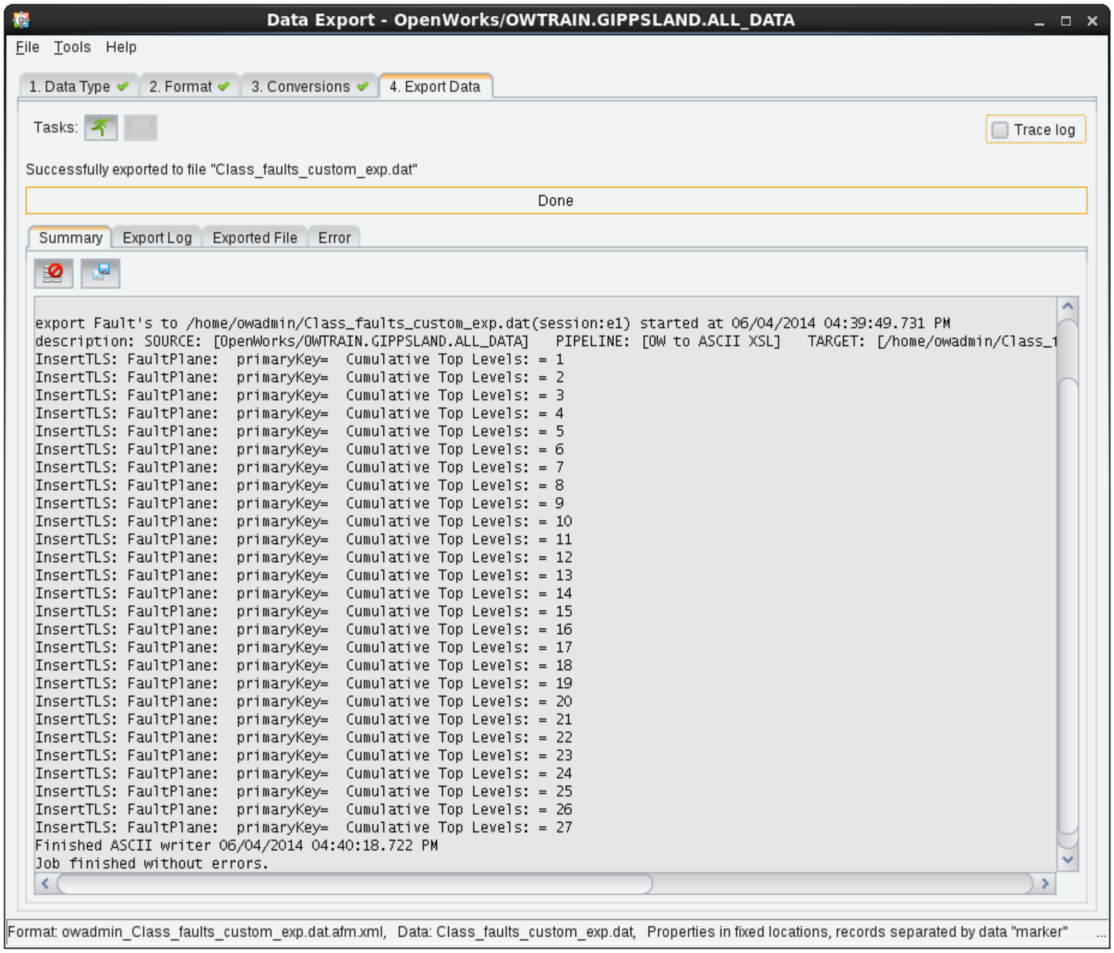
9. Select the **Conversions** tab.

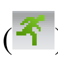


This panel is automatically populated with the project values. If you prefer the output file to be in a different CRS or measurement system, you can change them here (the CRS or measurement system must already be in the database, or you could use **Map Projection Editor** or **Measurement System Manager** to create them).

10. Select the **Export Data** tab.

The *Import Data* panel displays.



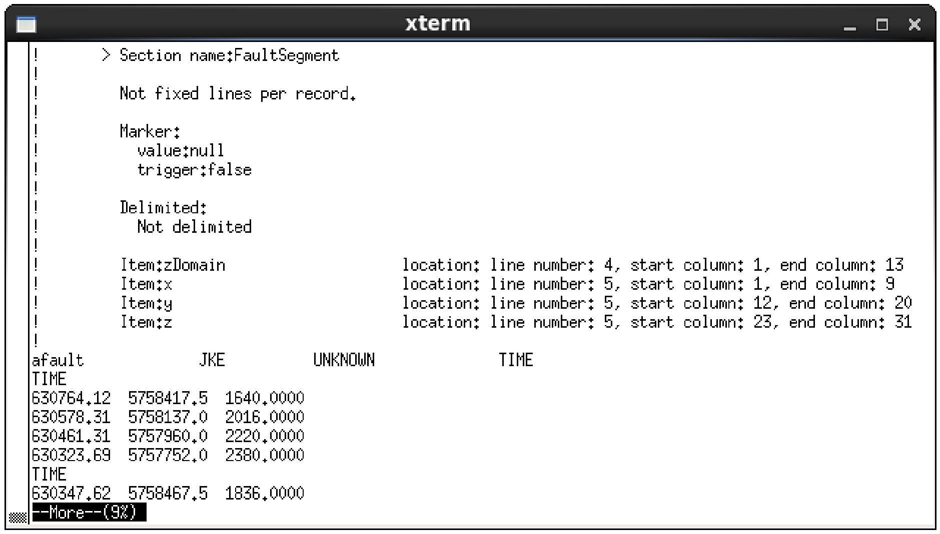
11. Click the **Run Import Job** icon () to import the data.

    When the import completes, summary, export log, and error information are available to review by selecting the appropriate tab. You can also preview the file.

12. Select **File** > **Exit** to exit the wizard.

13. View the actual data file in an xterm by navigating to the directory where you saved it and typing `<filename>`. For very large files you

may want to use other UNIX commands, such as head and tail, to view the file.



Exercises: Fault Management

Exercise 1: Fie/Fault Data Manager

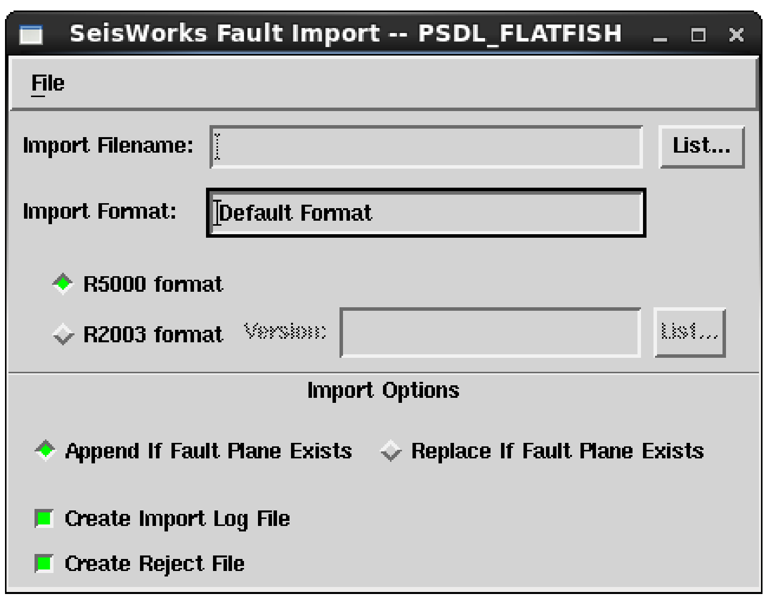
These exercises introduce fault management tools. You will import fault data into the *PSDL_FLATFISH* database and view the fault planes with WOW. You will check the validity of the data using Fault Data Manager.

Using Fie to Import Fault Data

Select the PSDL_FLATFISH project database is used for this exercise.

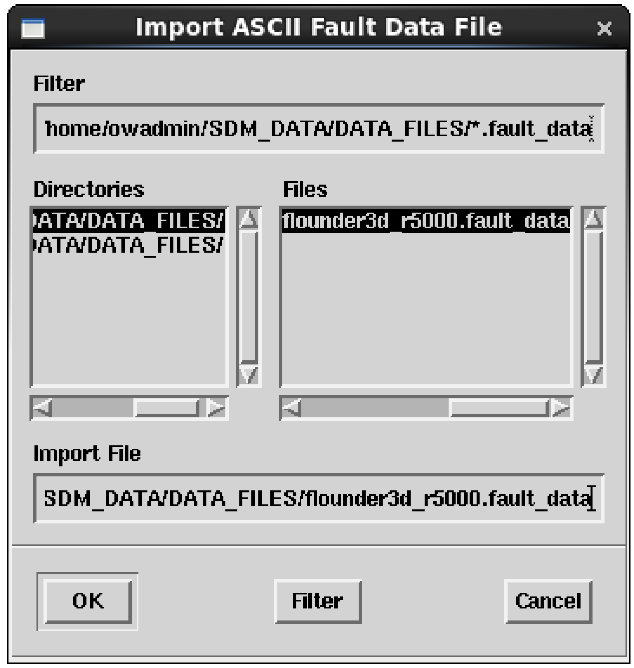
In this part of the exercise, you will import faults from the ASCII file, *flounder3d_r5000.fault_data* into the *PSDL_FLATFISH* OpenWorks project database.

1. Start **Seismic Tools**, then select **Faults > Import** from the Seismic Tools.



2. Click **List…** button for the Import Filename and select *flounder3d_r5000.fault_data*.

The *Import ASCII Fault Data File* dialog box opens. By default, it opens with the suffix *.fault_data* as a search criterion. You will need to filter to the correct file location.



3. Leave the **Import Format** as the *Default Format*.

4. Select the **Append If Fault Exists** radio button.

   This option adds the incoming fault segments and control points to the data tables associated with the OpenWorks fault of the same name. This action may result in duplicate data.

5. To generate a record of the import jobs, toggle on these options:

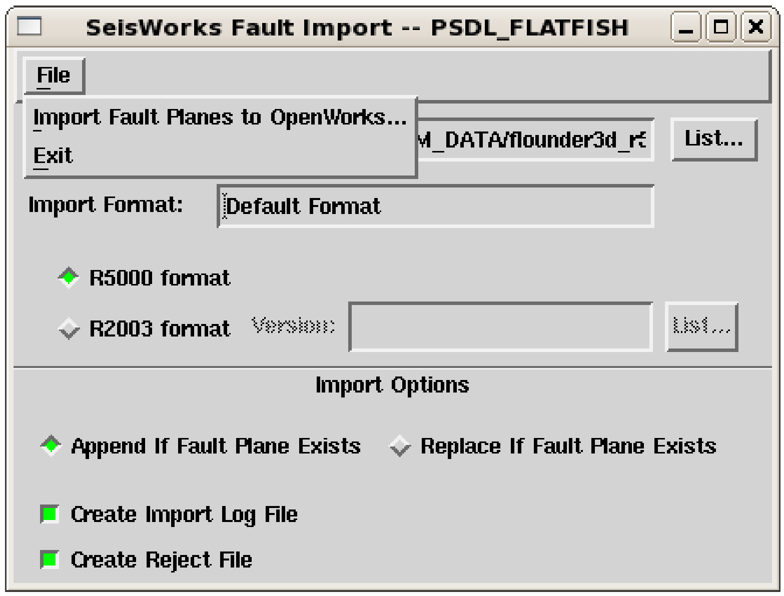
- **Create Import Log File** - Provides error messages for records that failed to load and reports the total number of points and segments loaded.

  The log file is given the same name as the input ASCII file plus the suffix *.fimLog* and is written to the OW_PROJ_DATA/SWDATA directory.

- **Create Reject File** - Lists those records that failed to load so that you can easily edit and reload them.

  The reject file is given the same name as the input ASCII file plus the suffix *.fimRej* and is written to the OW_PROJ_DATA/SWDATA directory.

6. Click **File > Import Fault Planes to OpenWorks…**.

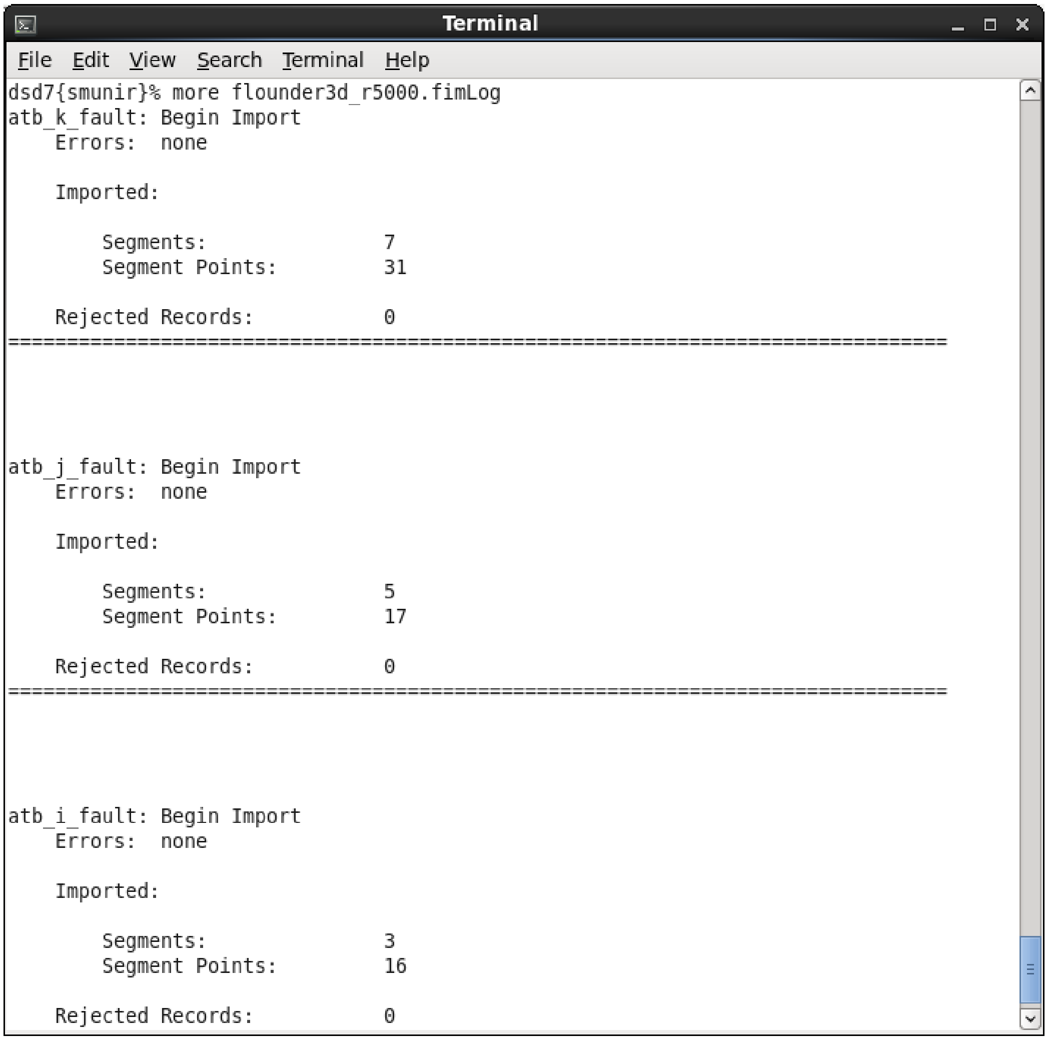


7. In an xterm window, change directories to the OW_PROJ_DATA/ SWDATA directory for PSDL_FLATFISH.

8. View the Log file by entering in an xterm window:

```
more flounder3d_r5000.fimLog
```

This file will tell you what was imported.



Terminal

File Edit View Search Terminal Help

```
dsd7{smunir}% more flounder3d_r5000.fimLog
atb_k_fault: Begin Import
    Errors:  none

    Imported:

        Segments:               7
        Segment Points:         31

    Rejected Records:           0
================================================================================




atb_j_fault: Begin Import
    Errors:  none

    Imported:

        Segments:               5
        Segment Points:         17

    Rejected Records:           0
================================================================================




atb_i_fault: Begin Import
    Errors:  none

    Imported:

        Segments:               3
        Segment Points:         16

    Rejected Records:           0
```

9. View the reject files by entering in an xterm window:

   `more flounder3d_r5000.fimRej`

   This file will be empty if all the data were loaded.

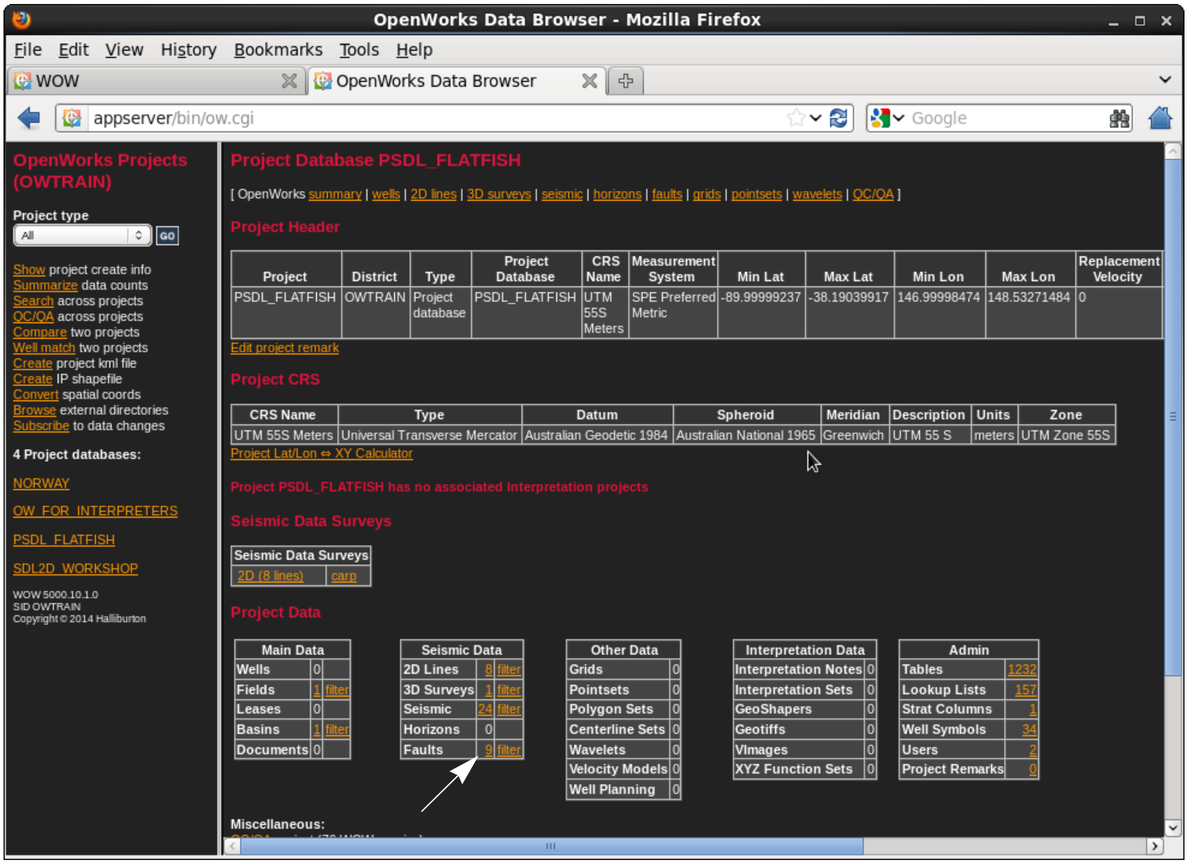
Viewing Fault Planes in WOW

1. Open a web browser and type **http://<your machine name here>** in the address bar to access WOW.

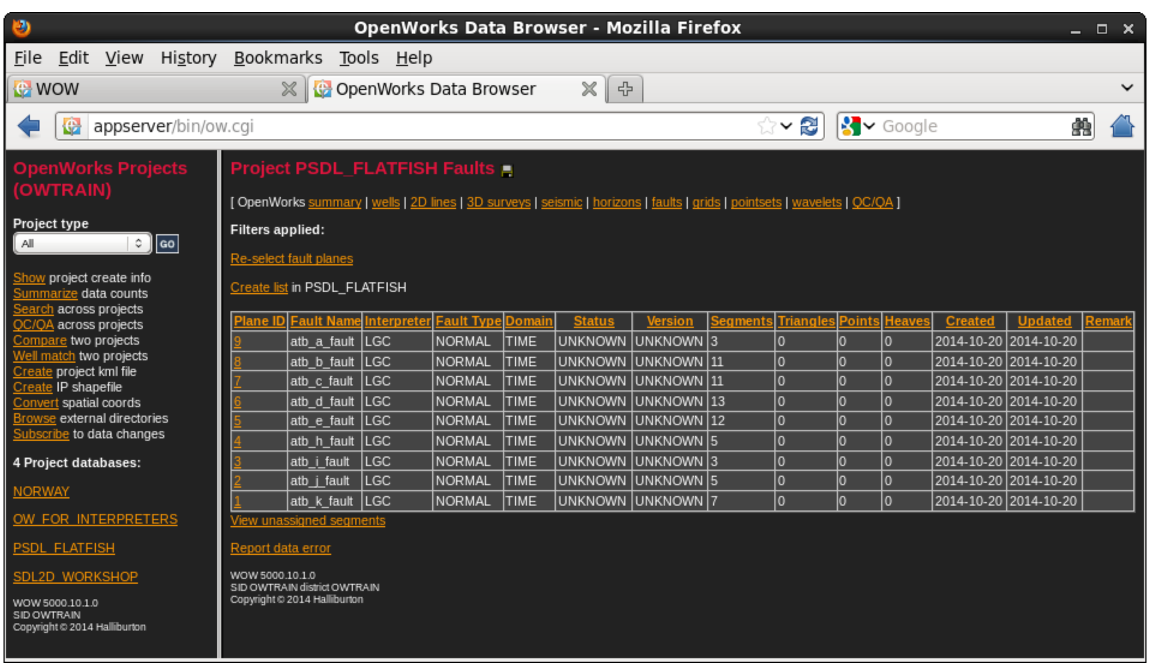
2. Click **OpenWorks** in the side bar on the left to display a list of OpenWorks projects.

3. Click **PSDL_FLATFISH** project database.

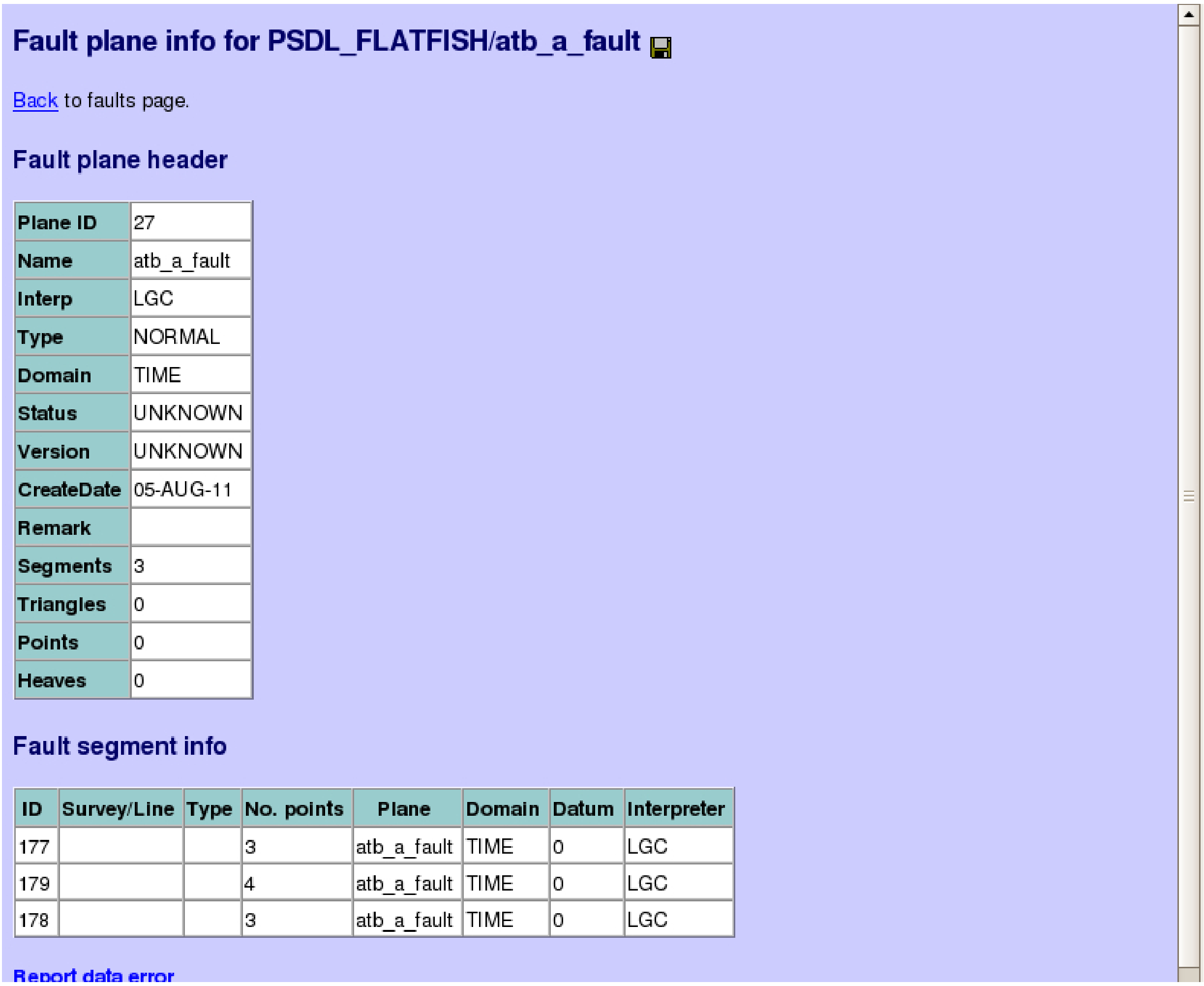
4. Click the number next to the **Faults** row in the **Project Data** summary table (**9**).



All the faults are displayed in a table.



5. Click the **Plane ID** number for a fault plane to see segment detail for the fault.



Fault plane info for PSDL_FLATFISH/atb_a_fault

Back to faults page.

Fault plane header

Plane ID	27
Name	atb_a_fault
Interp	LGC
Type	NORMAL
Domain	TIME
Status	UNKNOWN
Version	UNKNOWN
CreateDate	05-AUG-11
Remark	
Segments	3
Triangles	0
Points	0
Heaves	0

Fault segment info

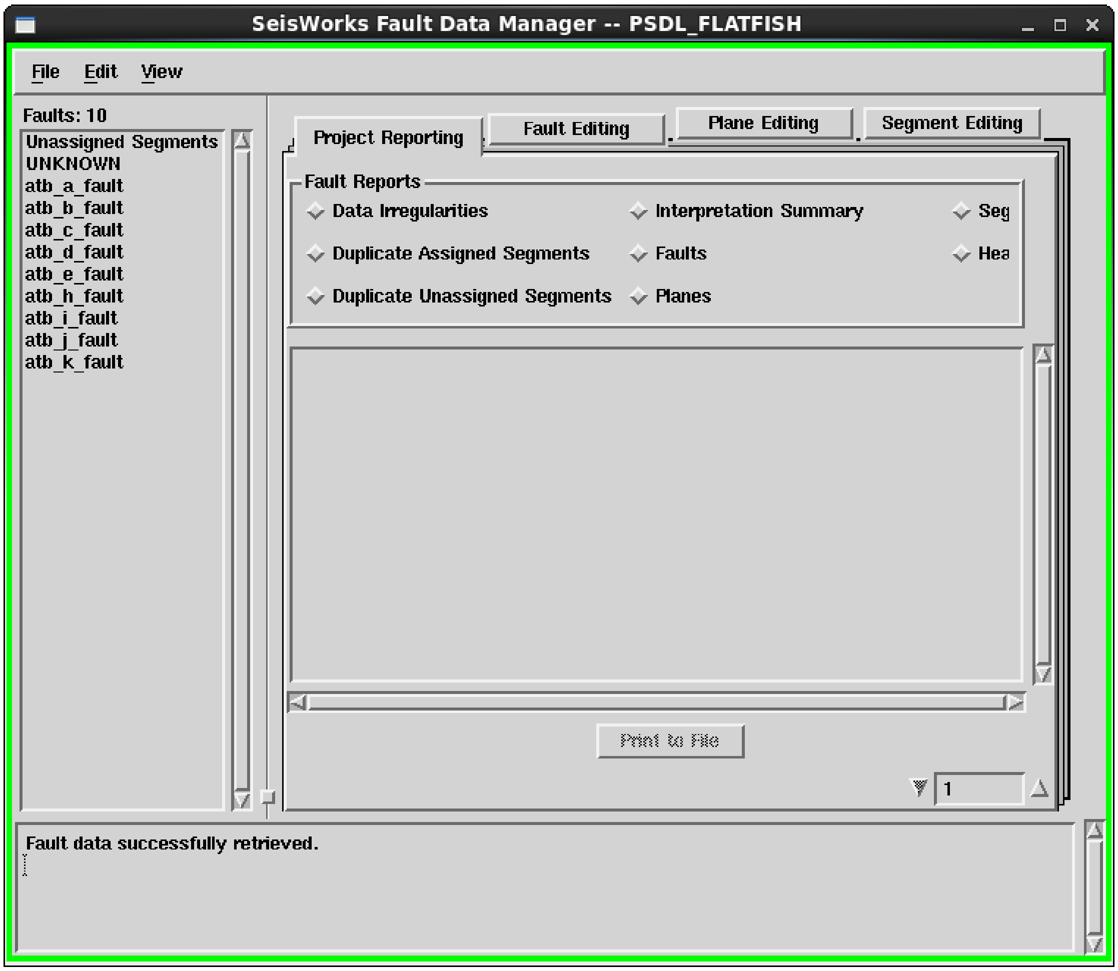
ID	Survey/Line	Type	No. points	Plane	Domain	Datum	Interpreter
177			3	atb_a_fault	TIME	0	LGC
179			4	atb_a_fault	TIME	0	LGC
178			3	atb_a_fault	TIME	0	LGC

Report data error

Using Fault Data Manager

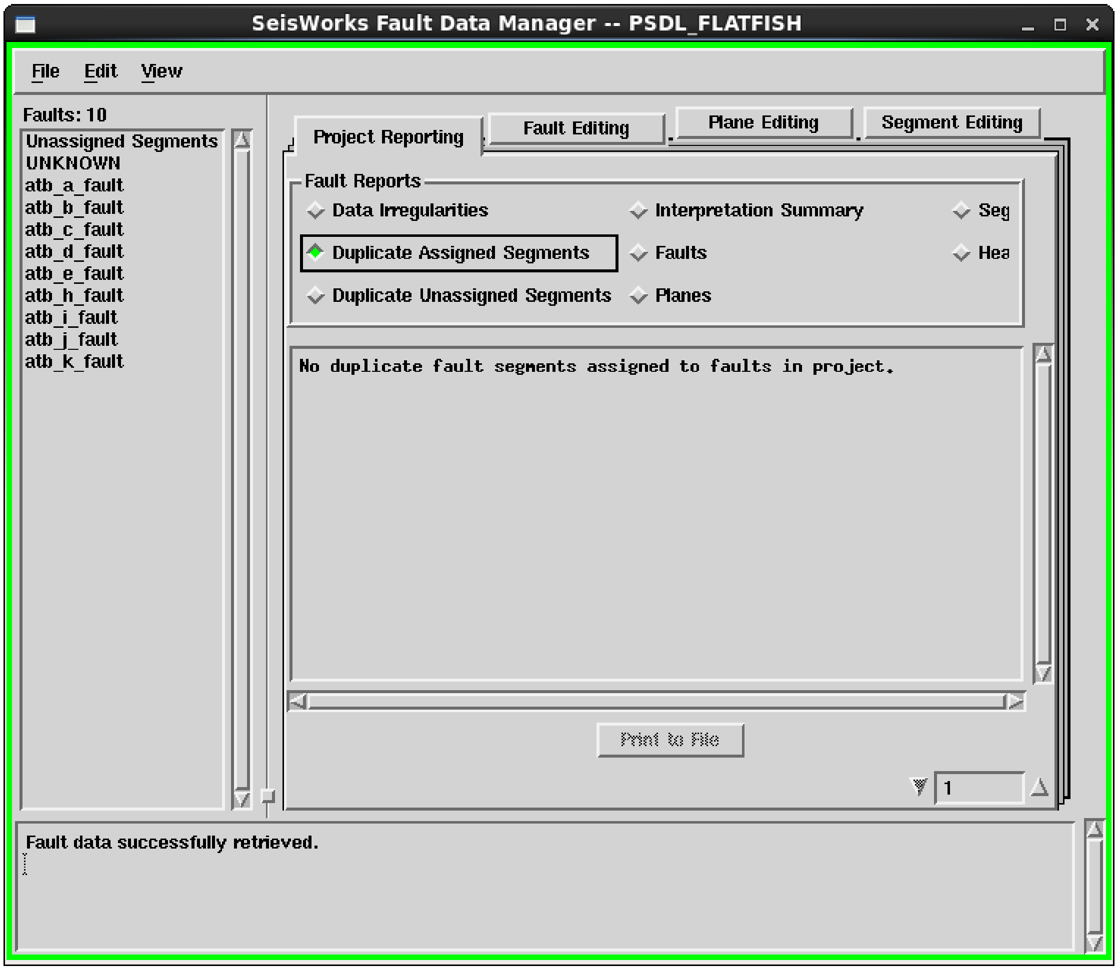
Fault Data Manager allows you to view and manage fault data. This part of the exercise shows some of the editing options and workflows for editing faults using this utility.

1. From the **Seismic Tools**, select **Faults > Fault Data Manager**.



The first tab option is labeled *Project Reporting*. Click the radio button next to any of the report options to view the report information.

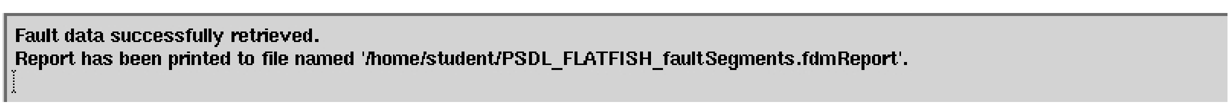
2. Click **Duplicate Assigned Segments** report.



If there were duplicate segments reports (faults must be exactly the same to be duplicates), you can remove them with **File > Delete All Latest Duplicates**. A message in the lower part of the window will inform you when the duplicate segments have been removed.

3. Click through the other possible reports to see what kind of information they provide.

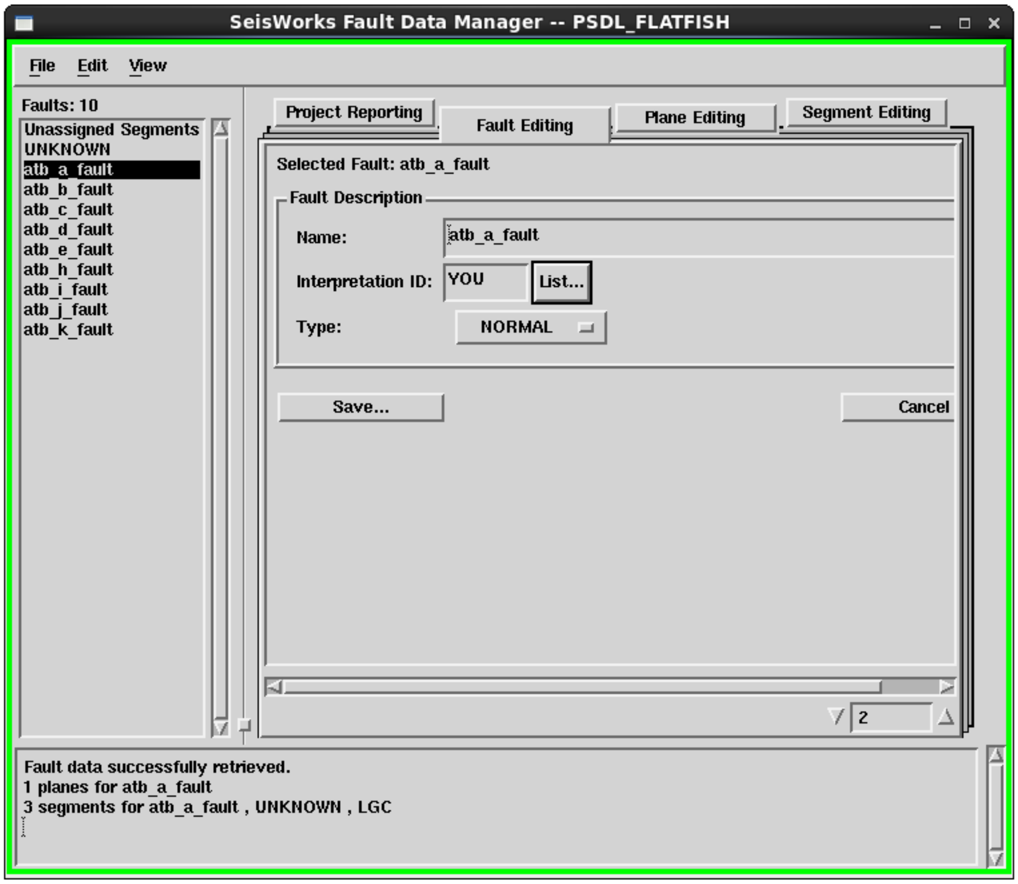
   If you want to get a copy of any of these reports, you can click on the **Print to File** button. A copy of the report will be written to your home directory with an extension of *.fdmReport*. The full name of the file will be listed in the message area.



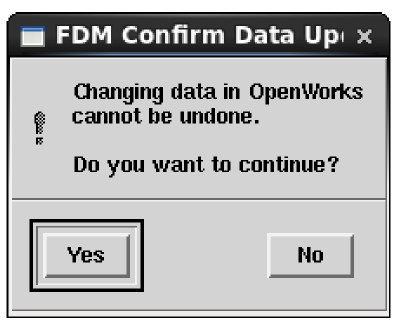
4. Click the *atb_a_fault* to highlight it.

   The *Fault Editing* tab will move to the front, listing the name of the fault, the interpreter, the fault type, and the method. To edit the description you type in a new name, select a new interpreter, or choose a different fault type from the dropdown list. Once you have made a change, the Save option becomes active.

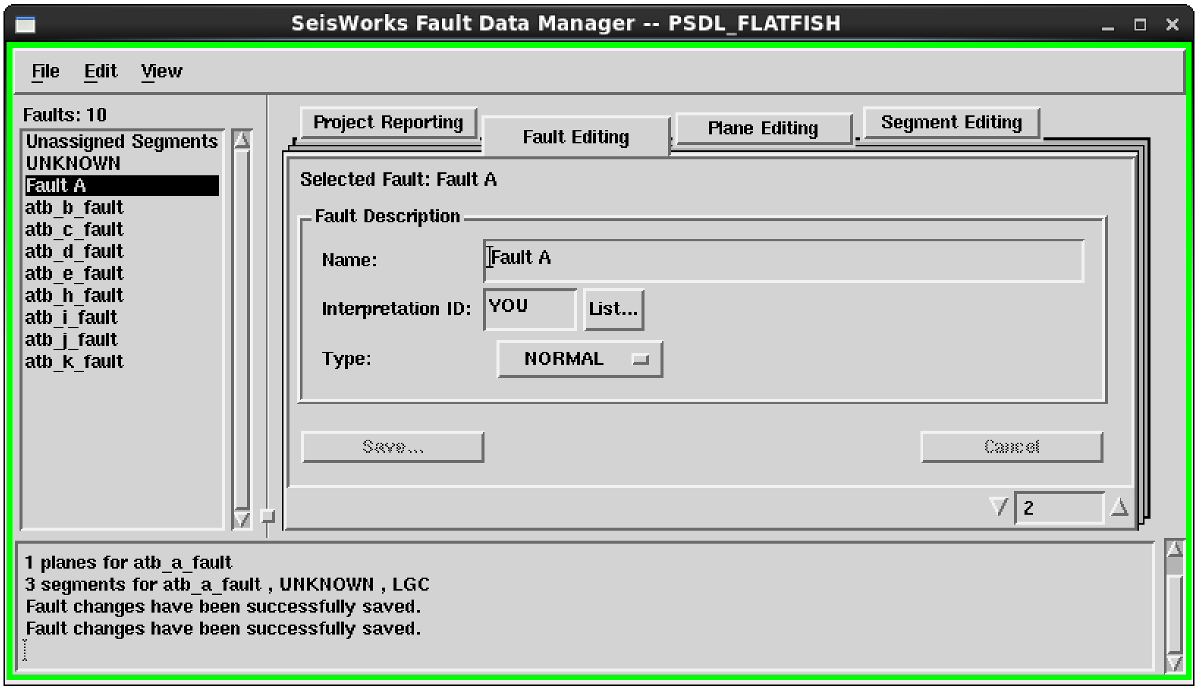
5. Change the name of the fault from *atb_a_fault* to *Fault A*. Select your Interpretation ID by clicking **List…**. Click **Save**.



A confirm message appears. Click **YES** to make the change.

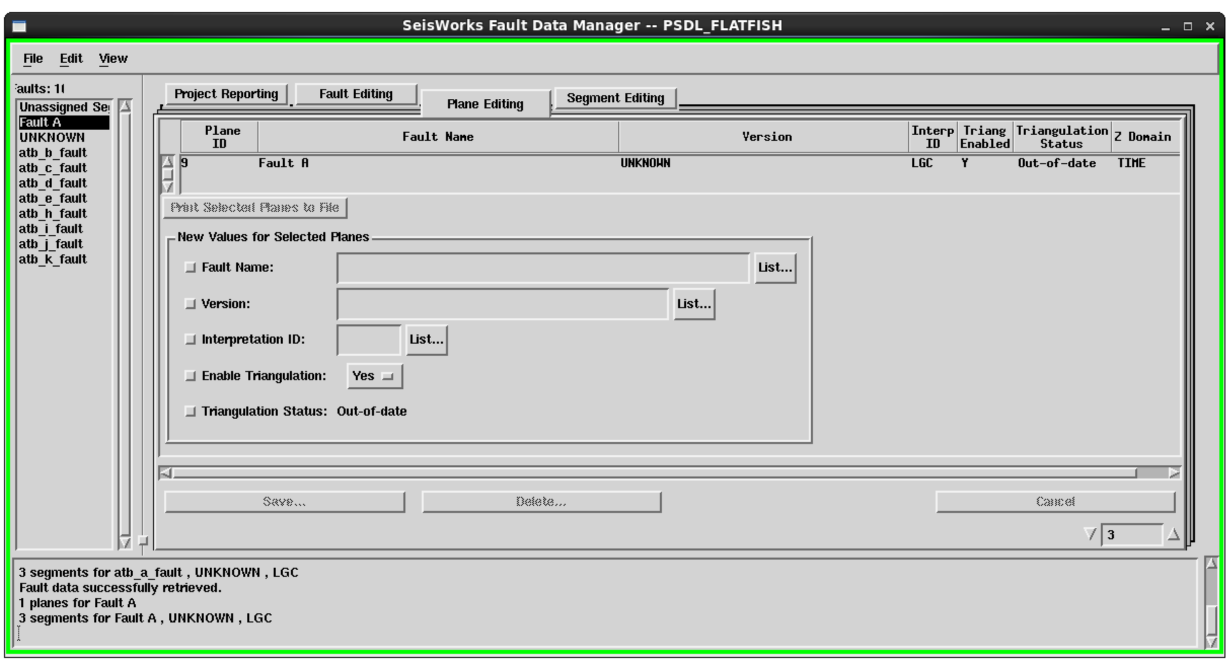


The new name can be seen in the fault name list.



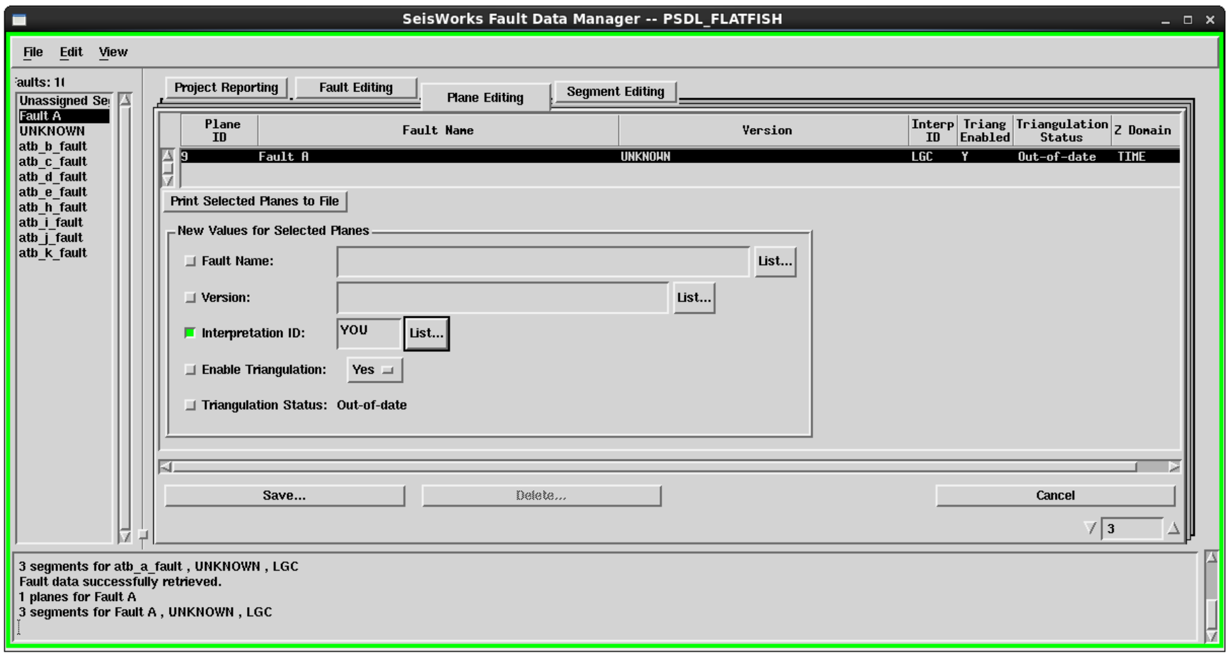
6. Select **File > Refresh Fault List** from the command menu to update the fault name change.

7. Select the new fault name (Fault A) and click the *Plane Editing* tab to look at the editing options.



8. Highlight the fault plane and change the interpreter using the following steps:

   - Select the box next to **Interpretation ID**
   - **Click List...** to select your interpretation ID as the new interpreter
   - Click **Save**

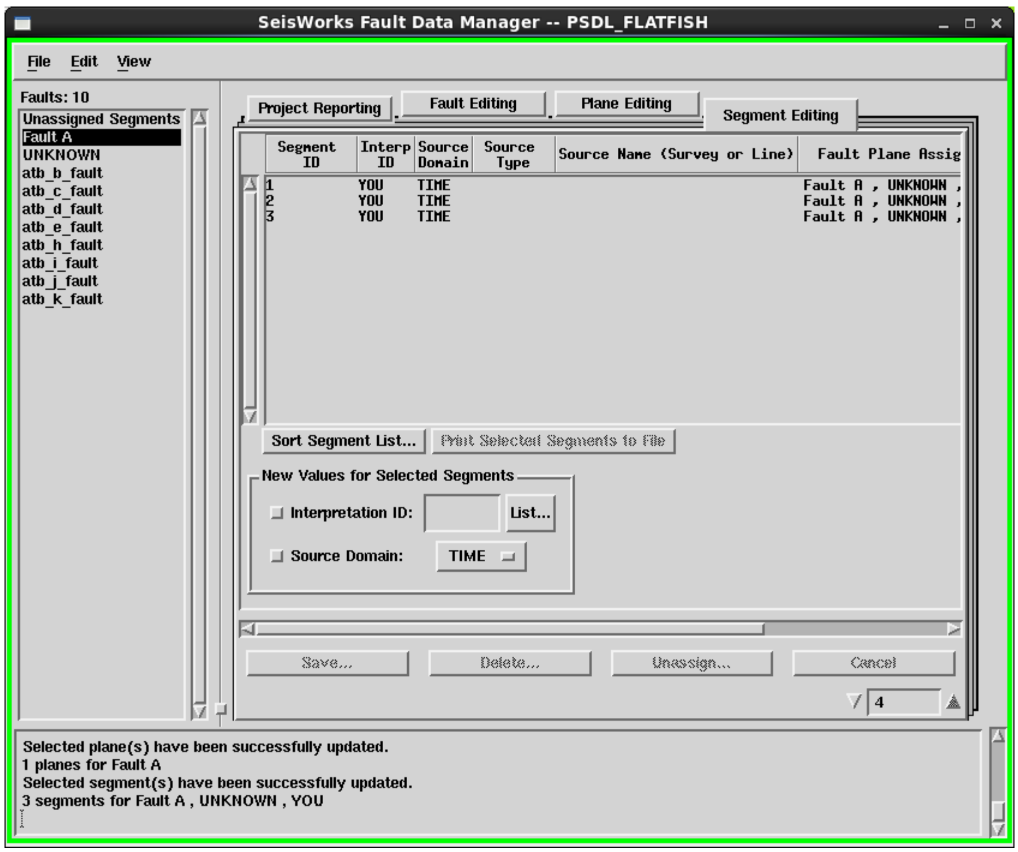


9. Click the *Segment Editing* tab.

   The Segment Editing tab lists the three fault segments that have been correlated with the highlight fault.

10. To change the interpreter, use the following steps:

    - Highlight all of segments
    - Click the check box next to **Interpretation ID**
    - **Click List…** to select your interpretation ID as the new interpreter
    - Click **Save**



The original fault name, plane and segments have now been edited with a new fault name and interpretation ID.

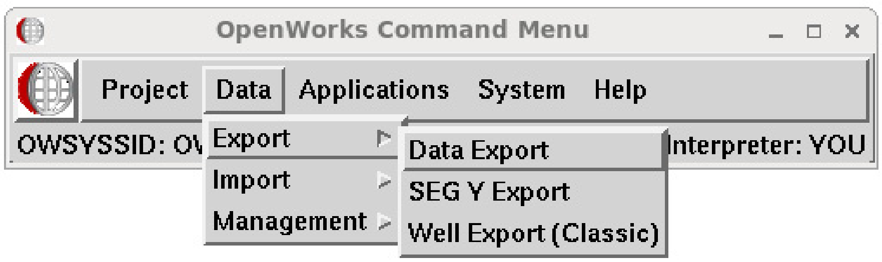
11. Minimize Fault Data Manager.

Exercise 2: Using the Data Export Wizard for Fault data with a Custom Format

In this exercise, Data Export Wizard is used to export fault data from the PSDL_FLATFISH project database.

In the next exercise, Data Import Wizard is used to import this fault data into another OpenWorks project.

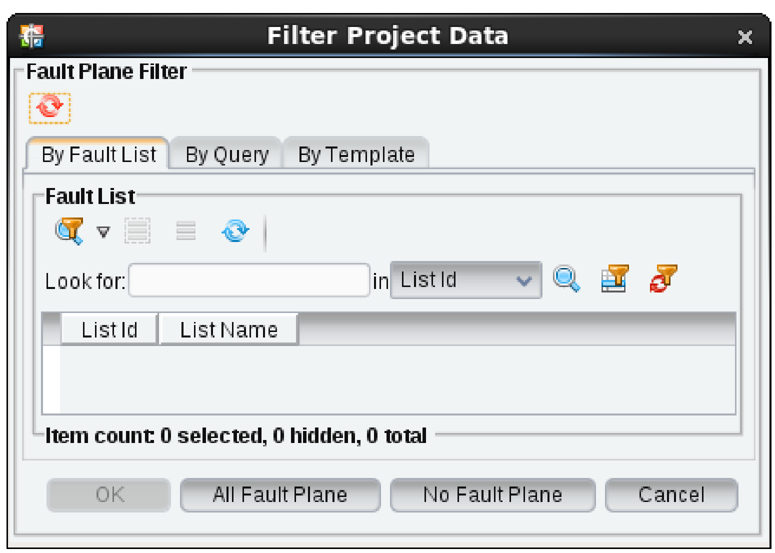
1. In the *PSDL_FLATFISH* project database, select **Data > Export > Data Export Wizard** from the OpenWorks command menu.



2. The Wizard opens under **Data Type** tab.

3. In **Data Type**, select **Faults** as the *Export data type* using the drop-down menu.

4. To select a fault list, select a fault list from the *Filter Project Data* dialog box.



5. Click the **All Fault Plane** button.

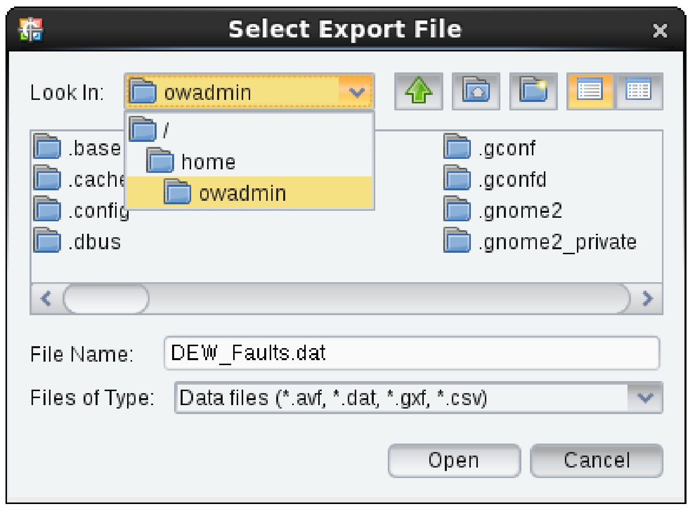
6. Select **Define New** from **Export Format**.

7. Select all the faults to export (highlight the rows in the Fault Plane list).

8. Click (...) adjacent to *Output data file*.

9. Make sure the directory path is your home directory.

10. Enter **DEW_Faults.dat** in the **File Name** field.



11. Click the **Open** button.

The **Example** data file is used to help you when you are defining a custom export format.

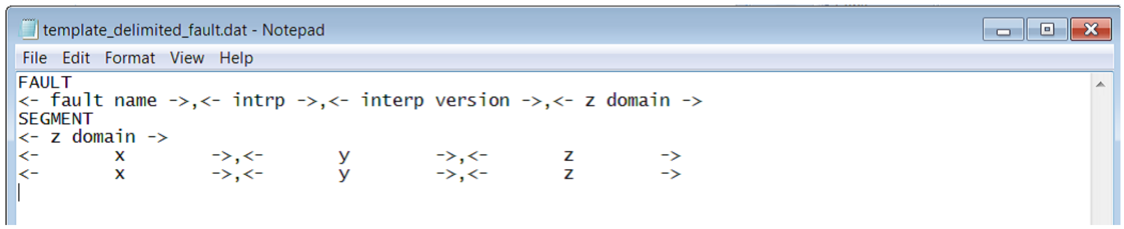
Since there is no Input data file to display in the format editor, this option gives you a chance to pick a data file to display in the editor. It just provides a "template" data file so that the format editing process is easier.

The process of creating a new custom format file is to define locations in the file where you want to place types of data stored in database tables.

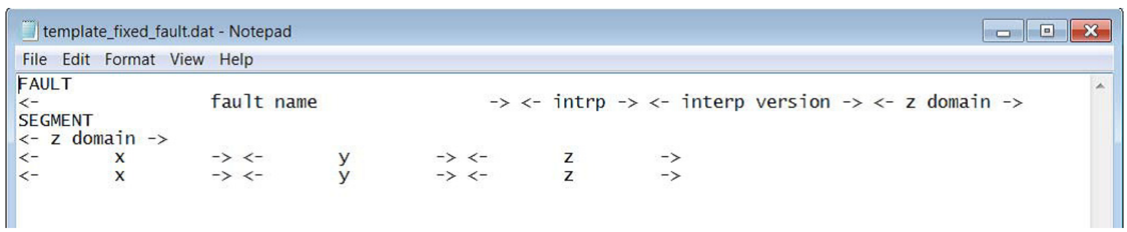
When creating a custom format, it is much easier if you to create a "template" file to use for the Sample data file that has the data types mapped out where you want them to be placed in the file.

For example, you could create a file "template" in a text editor that looks like one of the following for fault data.

Delimited Format:

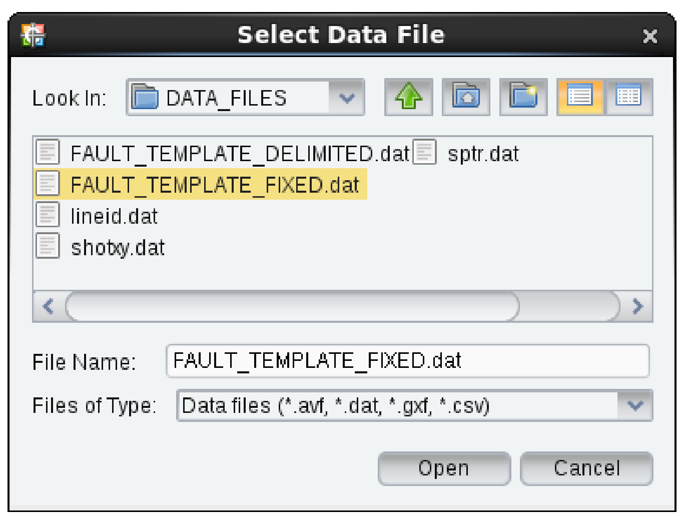


Fixed Format:

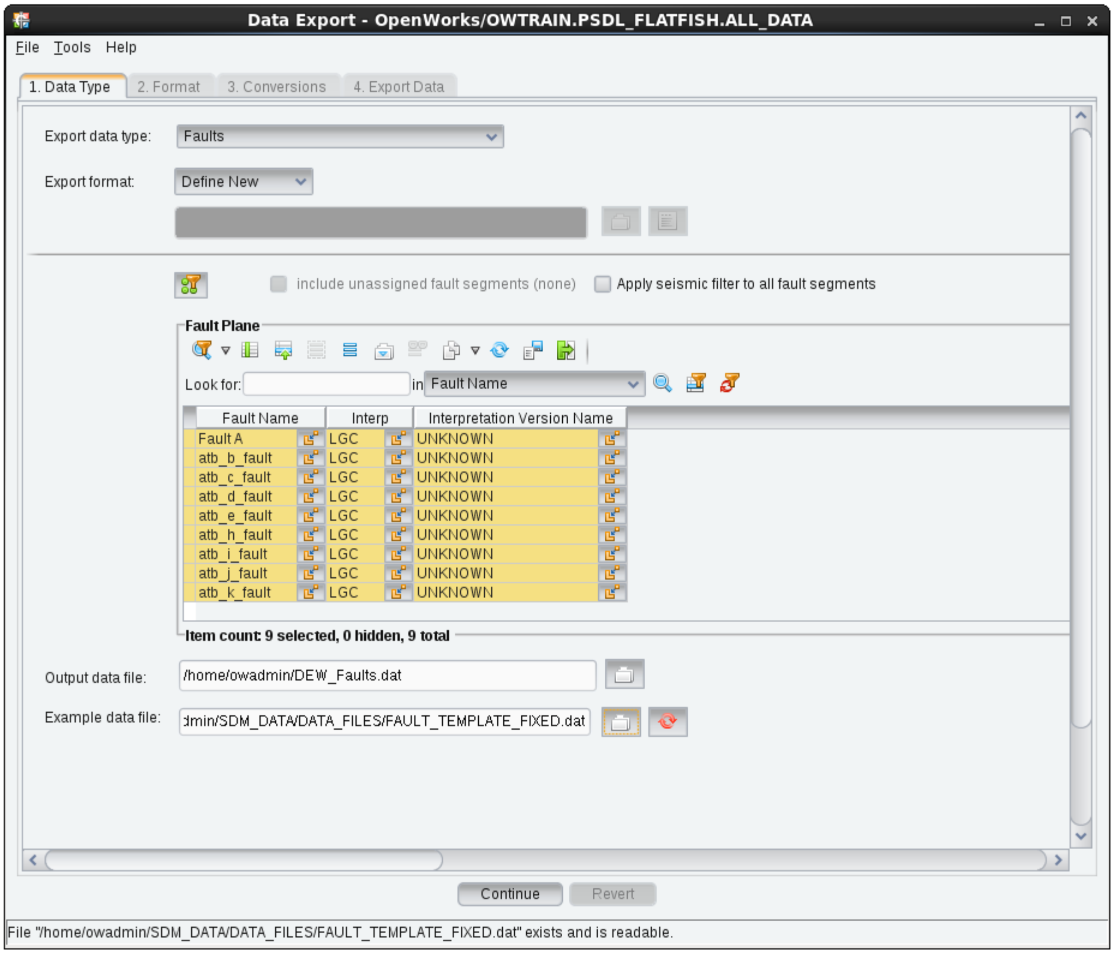


A format file has been created for you to use for this exercise in order to save time. At your office, you could create a similar file using a text editor with your own placement choices.

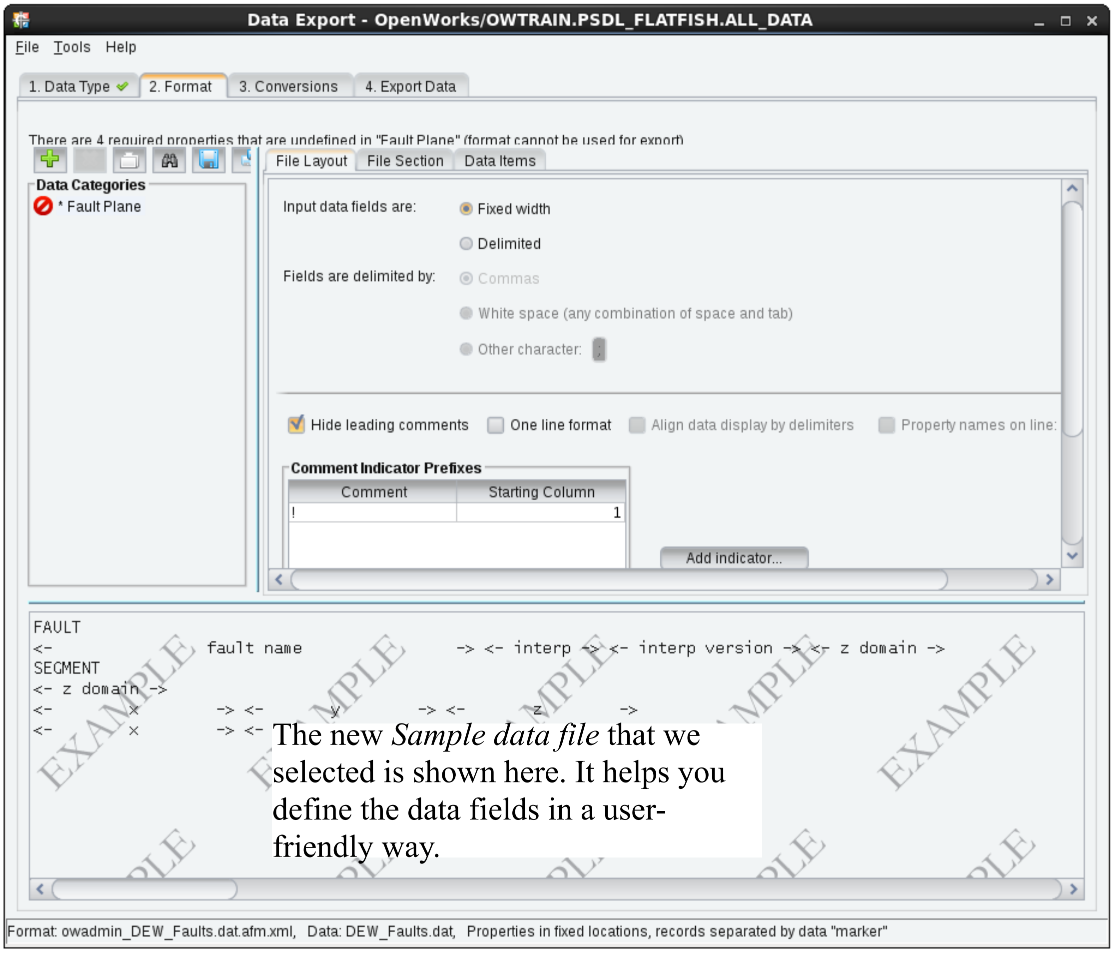
12. Select the template **FAULT_TEMPLATE_FIXED.dat** from **Example data file**.



13. Click the **Open** button.



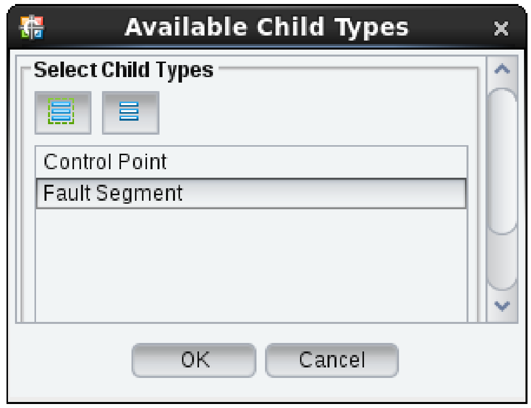
14. Click the **Continue** button to open the Format Editor.



Data Categories Tree:

The Data Categories tree allows you to select categories of the data type and indicate where data is located in the data file. You can also add categories that may not be listed in the tree, and configure them.

15. Click the **Add One Or More Child Types** () and select the Fault Segment and click **OK**.



File Layout:

The File Layout sub tab allows you to manage data arrangement in the data file.

The structure of the data fields in the file can be fixed length based on definitions you make or the fields may be delimited by commas, whitespace, or a specified character.

16. In the *Input data fields*, toggle on **Fixed with**.

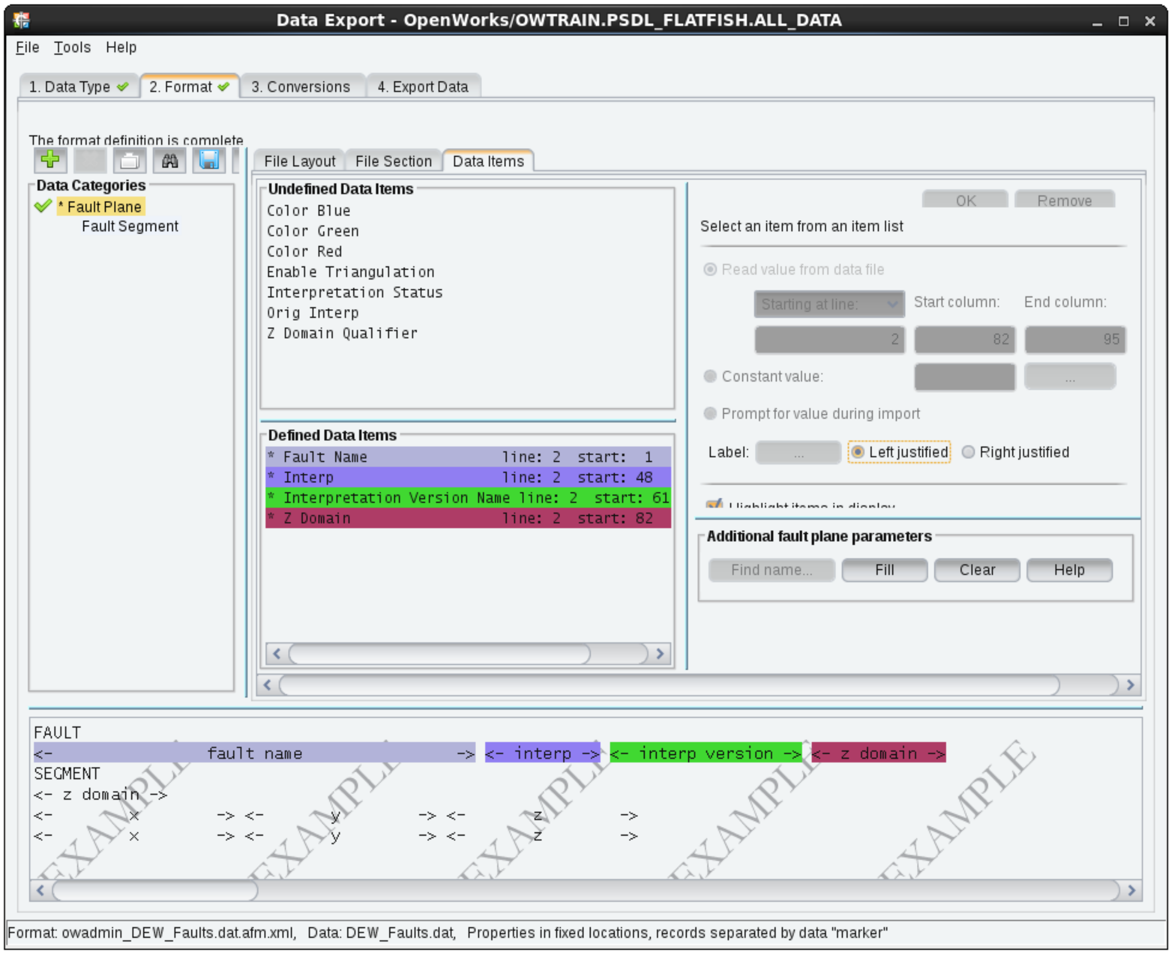
Data Items:

Select the location or value of a data type or category in the data file, and correlate the data type/category to a data item in an OpenWorks project. Each data type and category may be composed of one or more data items (or fields). Some of the data items are required. Required items have an asterisk before it and are at the top of the Undefined Data Items and Defined Data Items lists.

Others data items are optional. They are optional depending on whether the data file contains the data items and depending on whether you want the data in the project, even if the particular data is in the file.

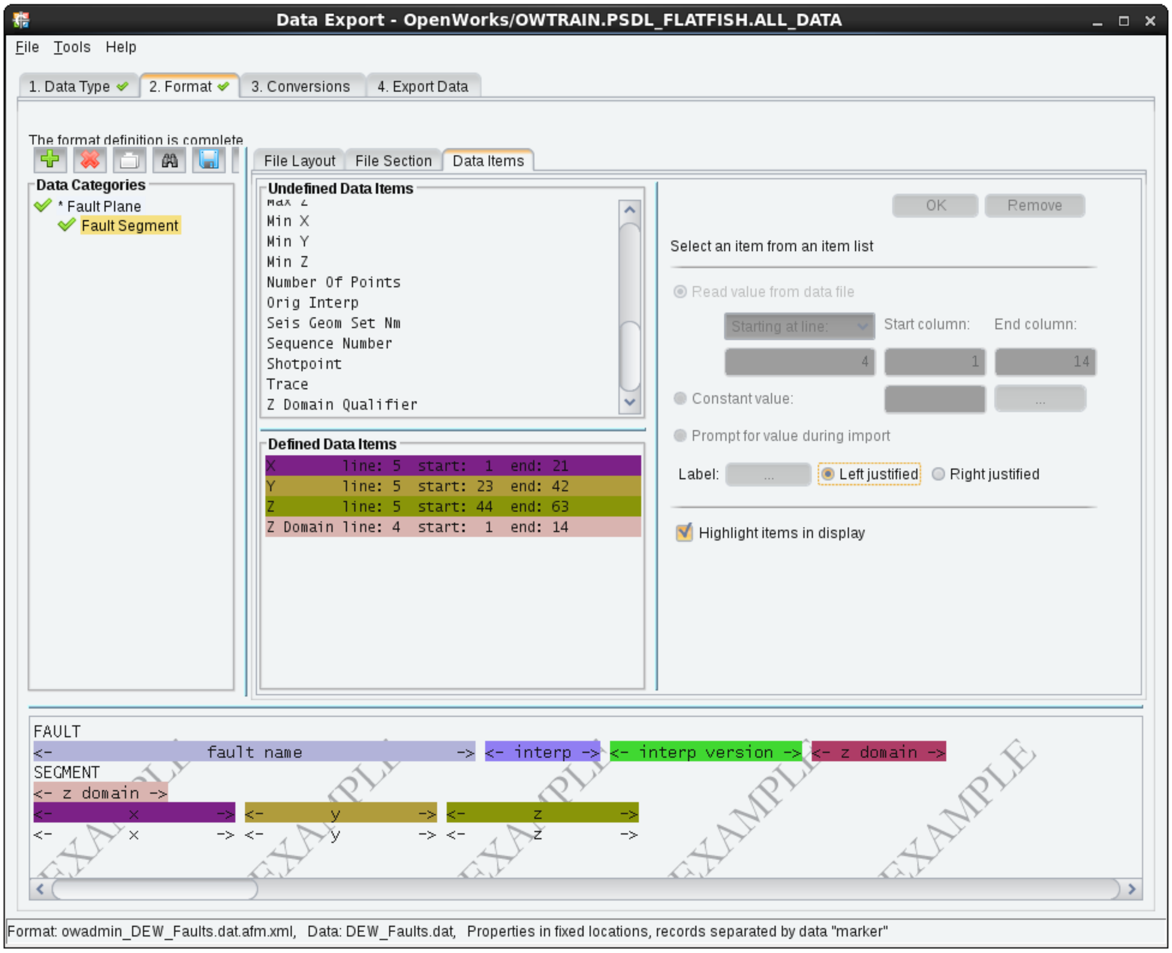
17. Correlate each field required under Fault Plane category.

Drag and hold MB1 to paint over the fault name range in the sample file template, do the same with all items.



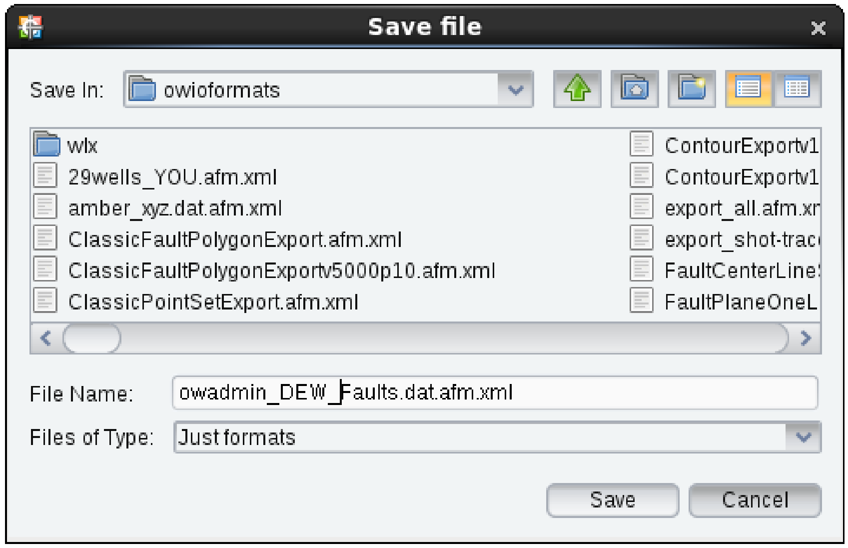
After all the data required for the category is completed, a green check mark () appears in the left of the Fault Plane category.

18. Continue correlating the Fault Segment category.

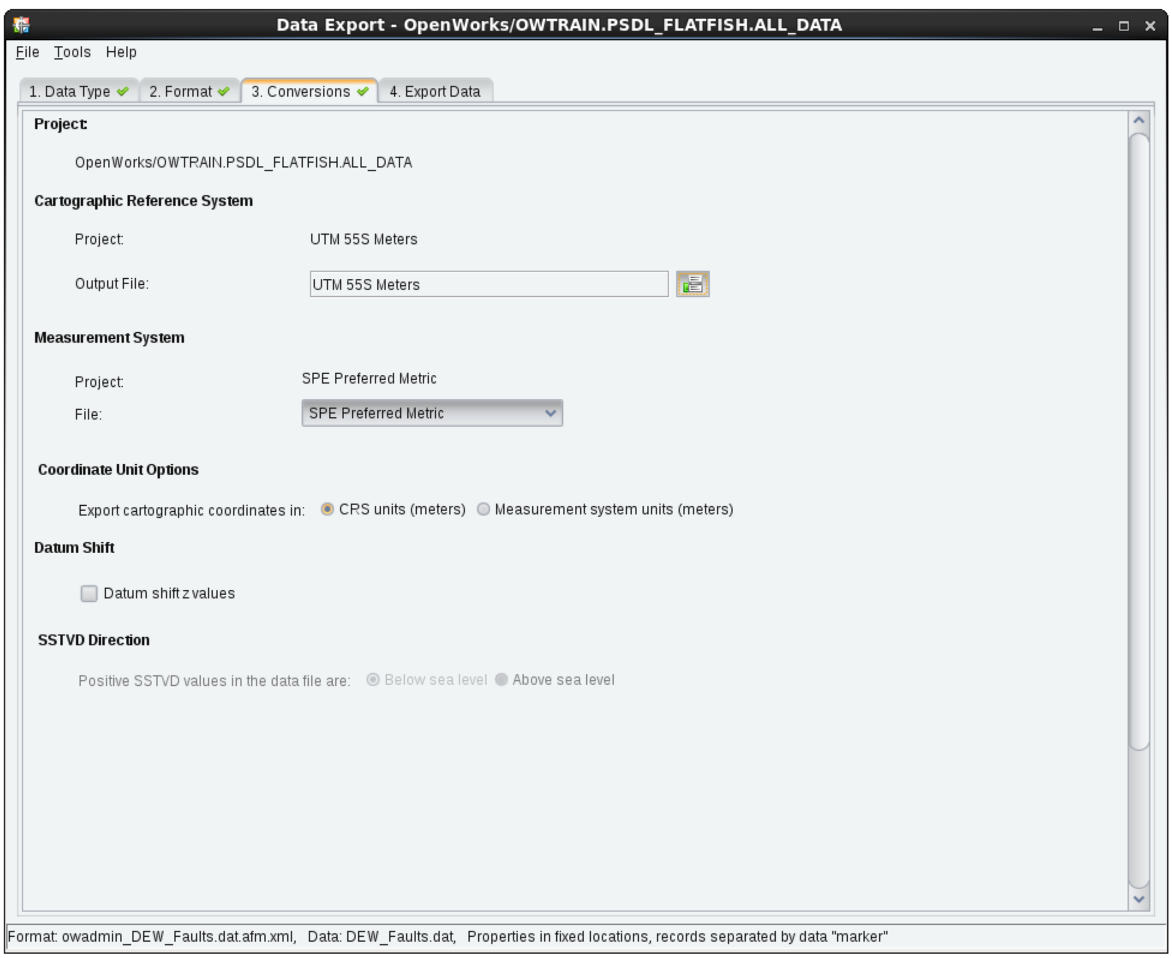


A green check mark (✔) appears to the left of the Fault Segment category as well. The format is ready to be saved.

19. Click the **Save format file** icon ( ).



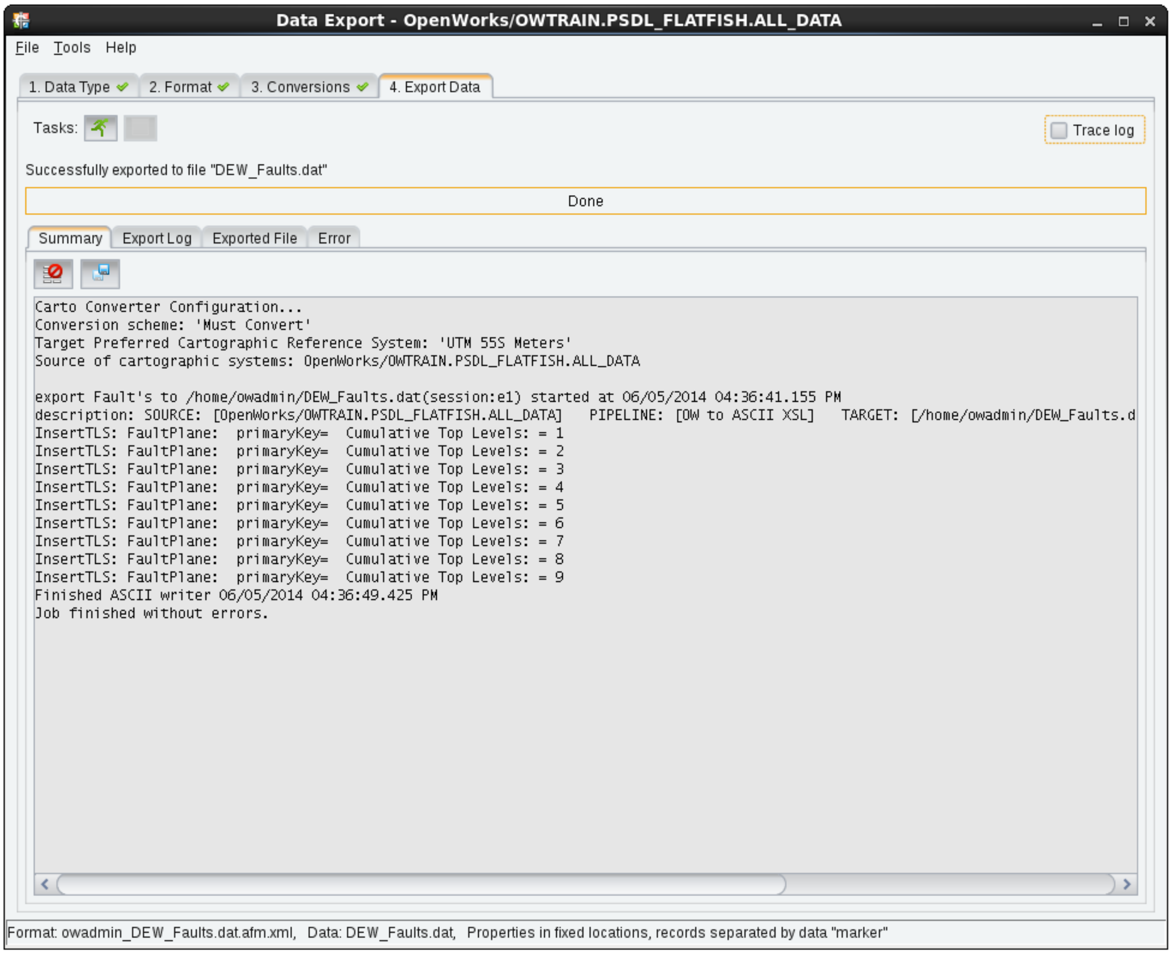
20. Select the **Conversions** tab.



21. Accept all the default parameters. Optionally, you can change the cartographic reference system, if needed.

22. Select the **Export Data** tab.

The *Data Export* panel displays.



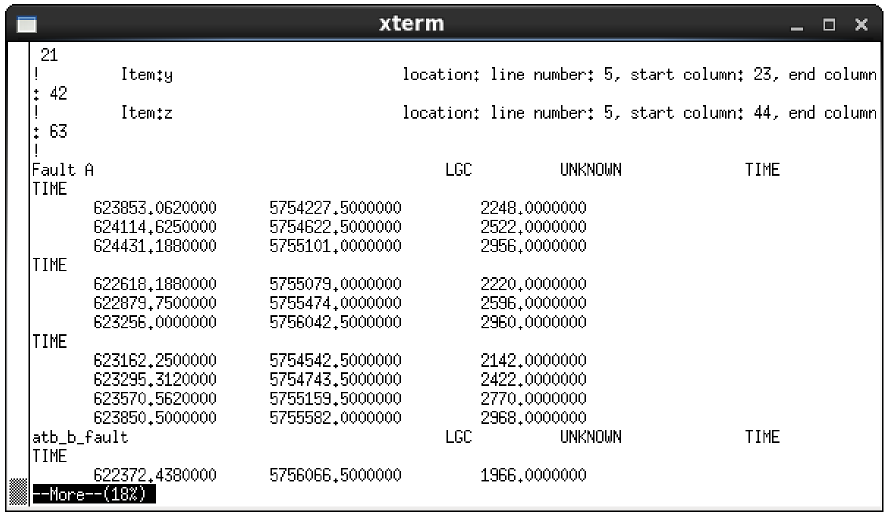
23. Click the **Run Export Job** () icon adjacent to **Tasks** to export the data.

When the export completes, summary, export log, and error information is available to review in the appropriate tabs. You can also preview the file.

24. When you are finished, select **File > Exit** to close the wizard.

25. View the actual data file in an xterm by navigating to the directory where you saved it and typing *more DEW_Faults.dat*. For very

large files, you may want to use other UNIX commands, such as *head and tail*, to view the file.



Using the Seismic Converter

The Seismic Converter is a user interface with bcm3d that allows the user to easily convert one Landmark 3D format file to another. Many conversions are supported, but not all. Below is a list of supported conversions.

File Type	Format	Supported Conversions
.3dv	.3dv 8-bit	Bricked int8 Compressed
	.3dv 16-bit	Bricked int16 Compressed
	.3dv 32-bit integer	Bricked float32, bricked float16, bricked float8 Compressed
	.3dv 32-bit float	Bricked float32, bricked float16, bricked float8 Compressed
Bricked .bri	Bricked float32	All .3dv & .3dh formats Bricked float16, bricked float8 Compressed
	Bricked float16	All .3dv & .3dh 32-bit formats Bricked float8 Compressed
	Bricked float8	All .3dv & .3dh formats
	Bricked float16 clipped	.3dv 8-bit, .3dv 16-bit .3dh 8-bit, .3dh 16-bit Compressed
	Bricked float8 clipped	.3dv 8-bit .3dh 8-bit Compressed
Compressed	Compressed	All .3dv & .3dh formats Bricked float32, bricked float16, bricked float8

Although supported, it should be noted here that Landmark does not recommend compressing 8-bit .3dv. Compression of 8-bit data introduces additional errors with little savings in disk space.

Please note that although .3dv, .bri, and .cmp files can be converted to .3dh files, you cannot convert .3dh files back using the Seismic Converter. The Seismic Converter utility is accessed from the Seismic Tools.

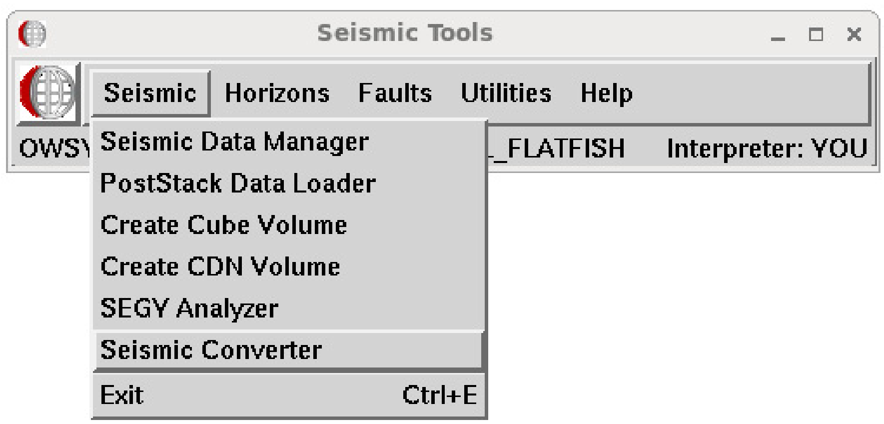
Optional Exercise: Using the Seismic Converter to Create Timeslices

In this exercise, you will use the Seismic Converter to generate a timeslice volume.

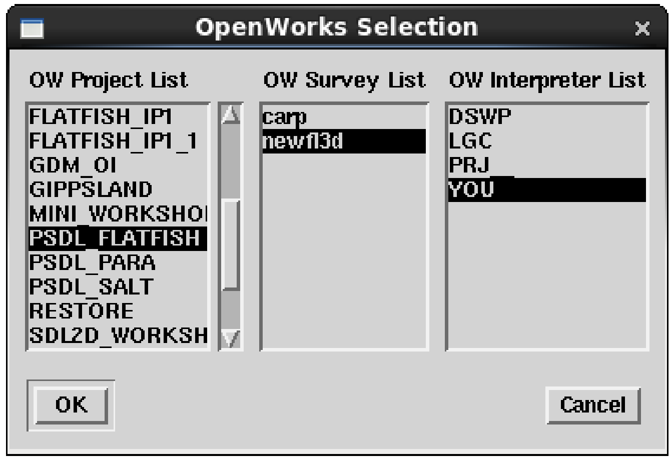
If you have an open SeisWorks session, please save the session and close it before opening the Seismic Converter. Once you have generated the timeslices with Seismic Converter, open your saved session to check the timeslices in SeisWorks.

1. Select PSDL_FLATFISH for the OpenWorks project database, and set your interpret ID.

2. Start the Seismic Converter from the Seismic Tools by selecting **Seismic > Seismic Converter**.



Select the survey and interpreter.



The left side of the Seismic Converter is where the information regarding the source dataset is input. Information about the target dataset is input on the right side of the window. Since the allowable conversions are a function of the source dataset characteristics, you cannot make selections in the Target Dataset field until a source dataset is selected.

Also note that a .3dh volume will not be found in the Seismic File List. This is because you may not use .3dh files as a source volume when using the Seismic Converter.

The Search/Filter/Reset buttons and text field are useful for sorting through a long list of seismic volumes.

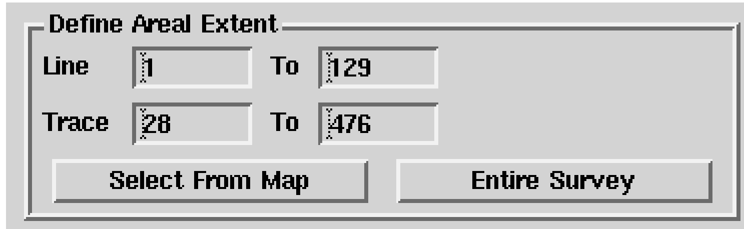
3. Select **SDLnewfl3d** from the Seismic File list. The right side of the Seismic Converter becomes activated.

   The *Define Areal Extent* portion of the dialog box allows you to convert only a portion of a dataset. You can change these values using one of the following techniques:

   - Click on **Select From Map** to derive the line and trace ranges from an area that you draw in a SeisWorks MapView.

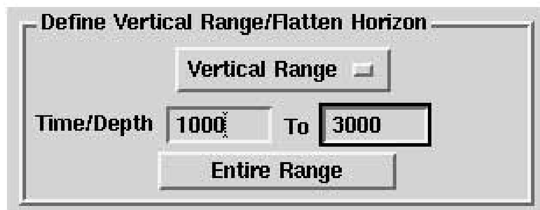
   - Click on **Entire Survey** to reset the line and trace numbers so that the entire line/trace range will be written to the output file.

   - **Manually** by placing the cursor in the appropriate field and typing in the desired line and trace numbers.



For this exercise, use the default values.

4. Under Define Vertical Range/Flatten Horizon select **Vertical Range** from the option button and enter **1000** to **3000** into the Time/Depth fields.



5. In the pull down menu next to Target File Type, select **3dh**. The right side of the window will change to accommodate the information necessary to create a .3dh file.

6. In the text field under Output Dataset Name, type `timeslice_32b`.

7. In the text field under Output Version Name, type `SEISMIC_CONVERTER`.

   Use the

button to select values for Dataset Attribute, Dataset Status, and Dataset Class.

   Suggestions are:

   Dataset Attribute - AMPLITUDE

   Dataset Status - working

   Dataset Class - migration

8. In the Sample Interval text field, type `100` by double-clicking in the box, then typing the number.

The OVERFLOW keyword is added to a .pcf file to handle the possibility of disk space overflow.

If you are defining a seismic volume file with a maximum disk space requirement that exceeds the amount of disk space currently available on the system and OVERFLOW is used, you will receive a warning message, but the file is created anyway.

If OVERFLOW is not used and the file exceeds the maximum disk space, the file is not created and the run is terminated.

In general, you will want to have enough disk space to load the dataset of interest. It is not a good idea to have seismic volumes that were not completely loaded, so it is usually best to not include the OVERFLOW keyword.

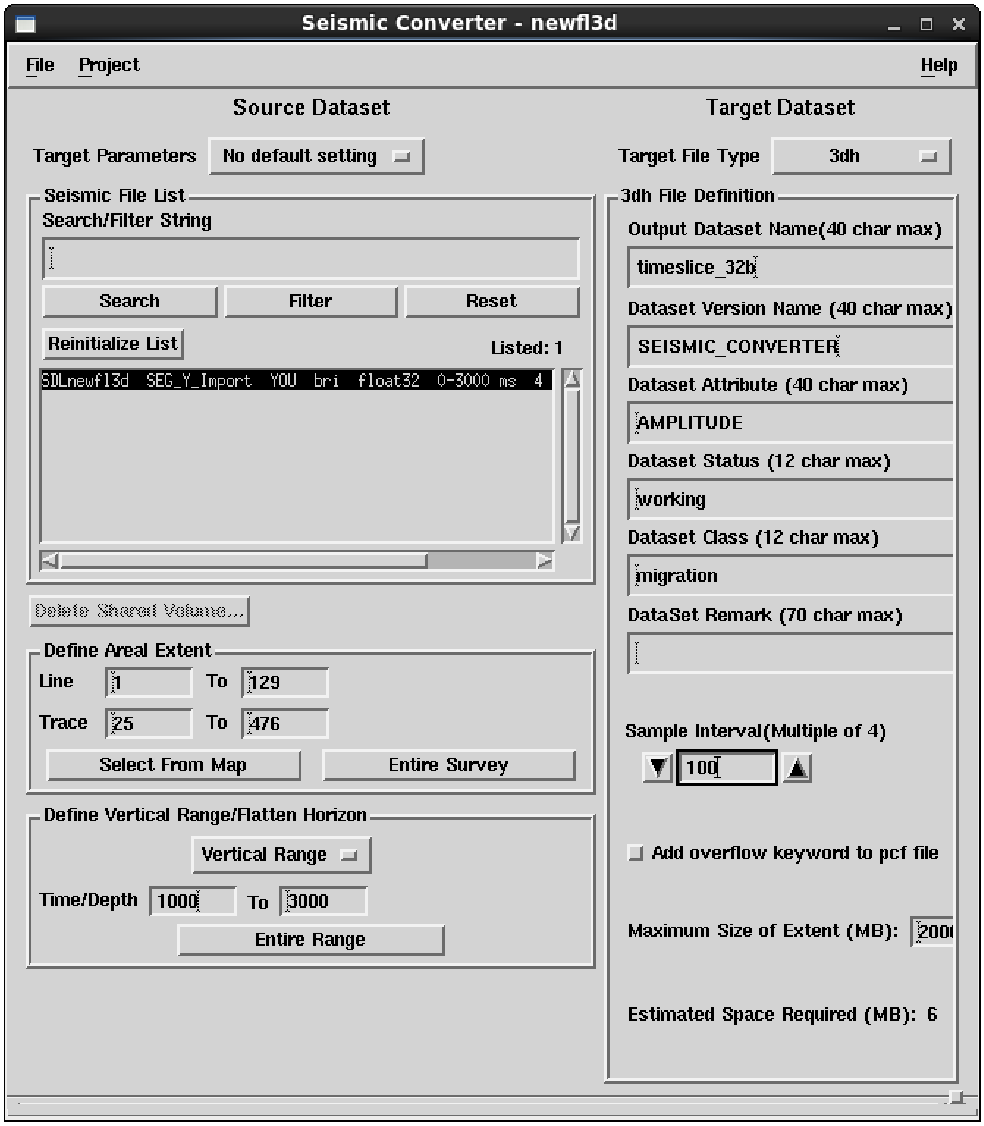
However, one scenario where the OVERFLOW keyword is useful is when you are converting a subset of a much larger dataset. The Seismic Converter will calculate space requirements for the whole dataset and will stop the job if there is not enough room for the whole dataset, even if you only wish to convert a portion. In this case, using OVERFLOW will allow the Seismic Converter to create the sub-volume, even though its calculations indicate there is not enough room.

9. For this exercise, leave *Overflow* unselected.

10. The default maximum extent size is 20000 MB. You can change this setting to a smaller value if desired by positioning the cursor in the field, double-clicking so that the number is highlighted, and then typing the desired setting.

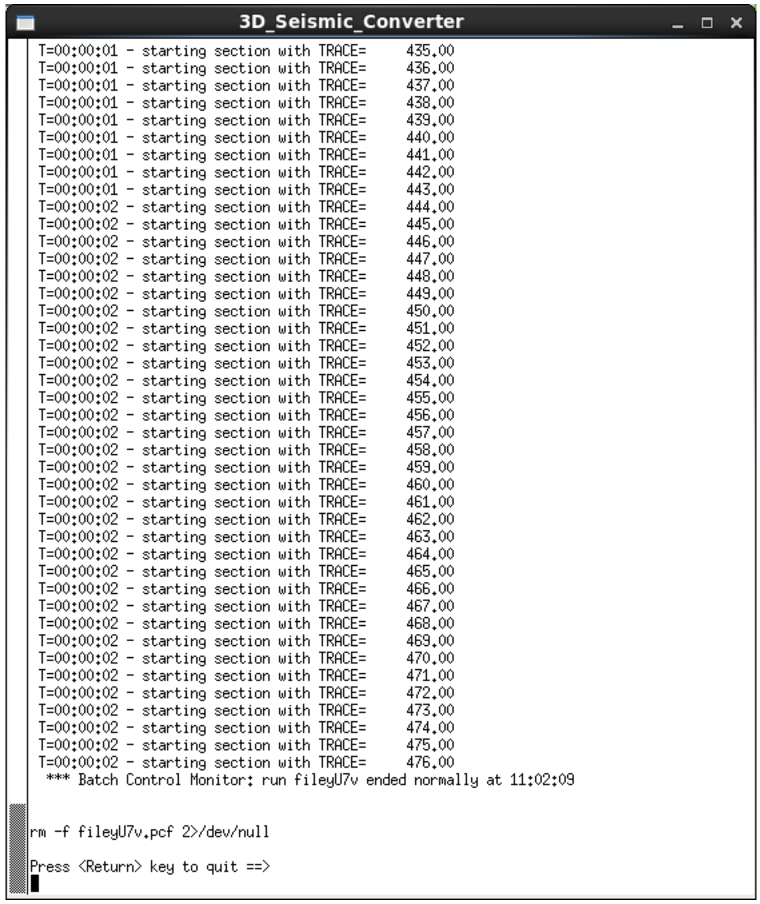
    For this exercise, accept the default value.

Your Seismic Converter window should look similar to the one below.



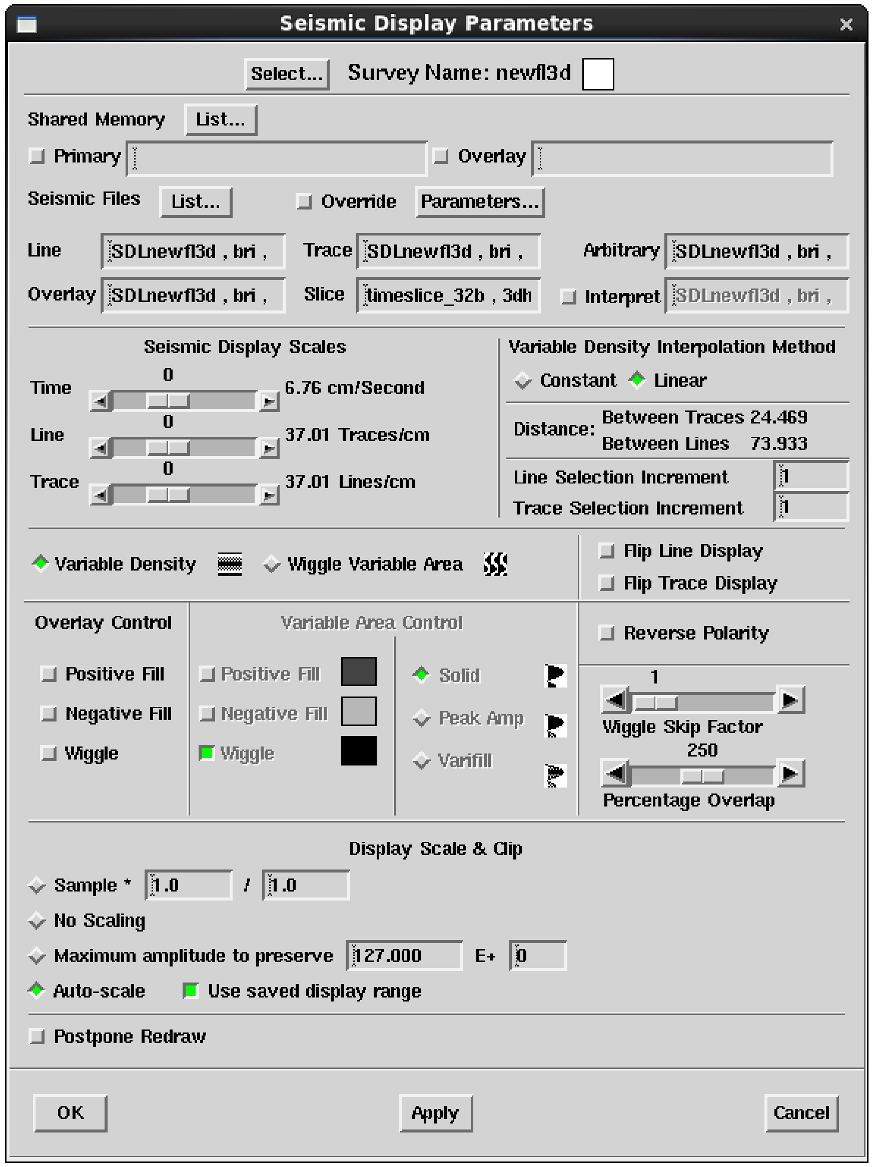
11. Select **File > Convert Seismic File** from the Seismic Converter menu bar.

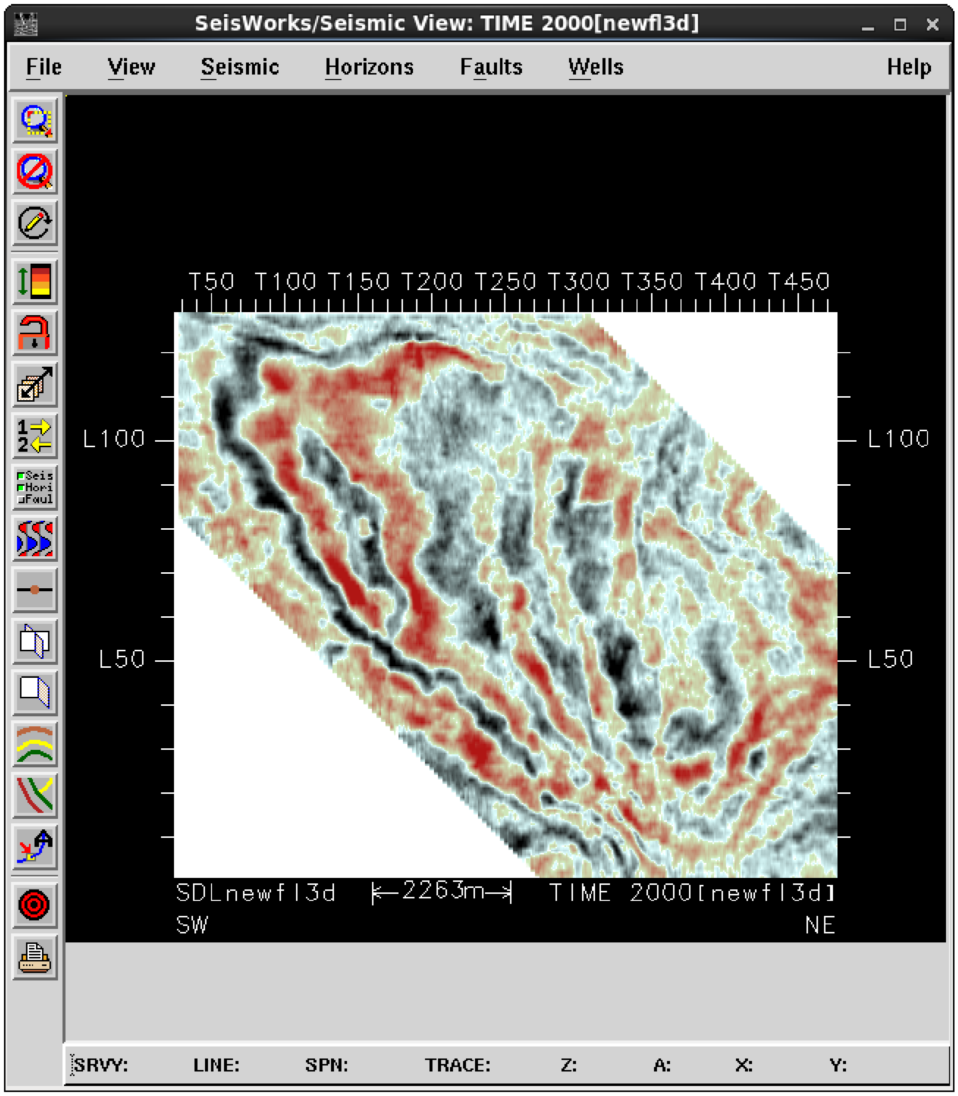
An xterm window will pop up, showing the progress of the conversion. When the job is complete, the xterm window prompts you with **Press <Enter>** key to quit. Press **<Enter>** to dismiss the xterm window while the cursor is located within the xterm window.



Since the job runs in the background, you can set up additional jobs and launch them as well. However, due to caching issues, it is better in most cases to submit only one job at a time.

12. Open a SeisWorks session and look at the new timeslice file that you created.



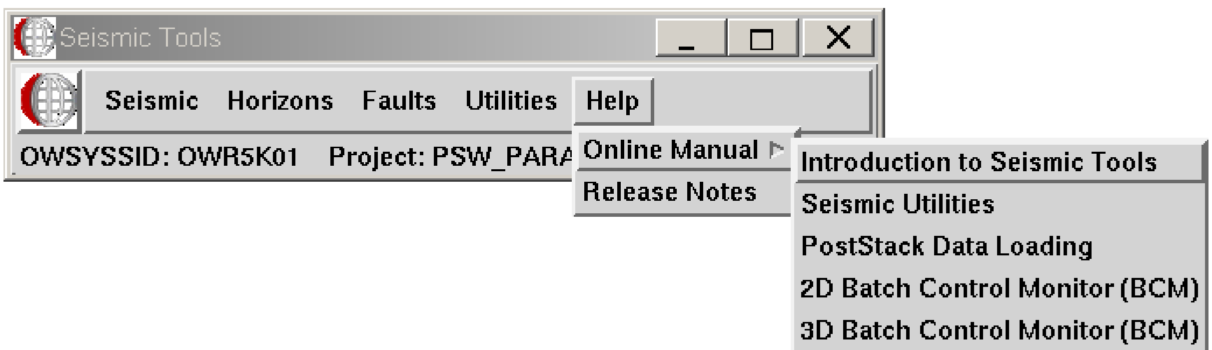


SeisWorks/Seismic View: TIME 2000[newfl3d]
File
View
Seismic
Horizons
Faults
Wells
Help
T50 T100 T150 T200 T250 T300 T350 T400 T450
L100
L50
SDLnewfl3d
2263m
TIME 2000[newfl3d]
SW
NE
SRVY:
LINE:
SPN:
TRACE:
Z:
A:
X:
Y:

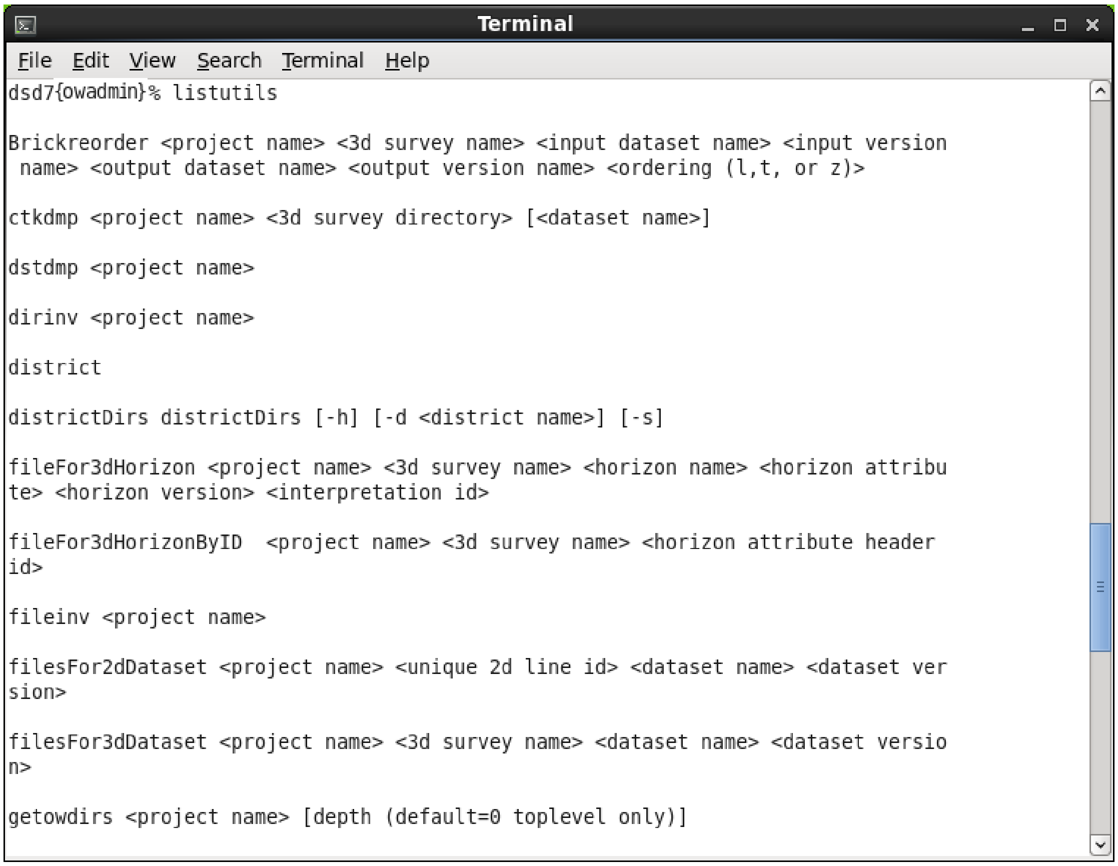
Command Line Utilities

Landmark provides various command line utilities to provide specific ways to manage interpretation projects, data, and your workstation environment. These command line utilities are invoked from the command line of an xterm window. The usefulness of some utilities will become increasingly clear as you become more experienced on the Landmark workstation.

A complete description of the command line utilities can be found in the online help by accessing **Seismic Tools > Help > Seismic Utilities**.



You can type *listutils* into an xterm to see lists of the common command line utilities that exist in $SEISUTILSHOME/bin. The *listutils* utility also lists the command line arguments for each utility. Using *listutils* provides a convenient way to recall a particular command along with its arguments.



A special note about command line arguments:

Some of the command line arguments may be strings with embedded blanks. When this is the case, the arguments must be enclosed in double quotes. For instance, if your survey name is *My Survey with Blanks* and you want to run a script like *surveyDirs*, you would have to run it as follows:

surveyDirs ddk_gippsland "My Survey with Blanks"

Some of the command line utilities commonly used to manage OpenWorks projects and seismic data are described below.

Utility Type	Utility Name	Utility Function
Districts	district	Returns the contents of the district.dat file.
	districtDirs	Provides information on the external directories defined for the specified district.
Projects	dirinv	Returns the full path to all directories where cataloged files reside for the OpenWorks project. If the contents of these directories are backed up, all cataloged files will be backed up. Non-cataloged files that reside in these directories would also get backed up using this approach.
	fileinv	Returns the full path of all catalogued files in an OpenWorks project. Designed to aid in backing up all files in an OpenWorks project when the OpenWorks project itself is backed up.
	getowdirs	Lists the subdirectories associated with an OpenWorks project. A depth argument controls how many levels of subdirectories to list.
	listProjects	Lists all projects in the SID of the current district, plus the access permissions for the current user.
	lsowdir	Lists the files in the OpenWorks project data directories (owdir.dat). If no wildcard spec is provided, all files will be listed.
Seismic Data	dstdmp	Dump headers of multi-extent files.
	segychk	Positions and dumps data from a SEG Y tape or disk.
	seisDatCopy	Copies some Landmark-provided files from $SEISUTILSHOME/dat to the OpenWorks data directories for the specified OpenWorks project.
Fault Data	Fex	Exports fault planes to ASCII files.
	Fim	Reads ASCII fault files and imports them to the OpenWorks database.

Utility Type	Utility Name	Utility Function
Line and Survey Data	lineDirs	Returns the list of existing storage directories for the specified line.
	linesWithVersion	Returns the unique 2D line for every line where the specified seismic dataset exists.
	listLines	Returns the unique 2D line ID, storage directory, and trace ranges for every line in the project.
	listSurveys	Returns the name and storage directory for every 3D survey in the project.
	seisZRangeFix	Resolves possible problems with the migration of z range values into Release 5000.0.0.
	surveyDirs	Returns the list of existing storage directories for the specified survey.
	svyinfo3d	Displays the basic information about a 3D survey's geometry in the terminal. It connects to the OpenWorks SID specified in the current OpenWorks session.
Horizon Data	fileFor3dHorizon	Returns the external file for the specified horizon and 3D survey.
	fileFor3dHorizonByID	Same as fileFor3dHorizon except that the horizon is identified by the internal attribute header ID.
	horizonsFor2dLine	Returns the horizons that have been defined on the specified 2d line.
	horizonsFor3dSurvey	Returns the horizons that have been defined on the specified 3d survey.
	horizonFromFileName	Returns the horizon attribute catalog keys and survey name corresponding to the horizon file.
	listHorizons	Returns the list of horizons in the project.
	Mltimp	Imports multiple horizons to SeisWorks software.
	Mltexp	Exports multiple horizons from SeisWorks software.
Import/Export Remarks	importRemark exportRemark	Imports and exports short descriptions of remarks about data.
System	space	Displays the space on drives.

Utility Type	Utility Name	Utility Function
Files	ctkdmp	Provides a report of the validity and accessibility of bricked and compressed datasets created by the compression toolkit (CTK).
	repairCTK	Repairs bricked and compressed files in certain conditions.

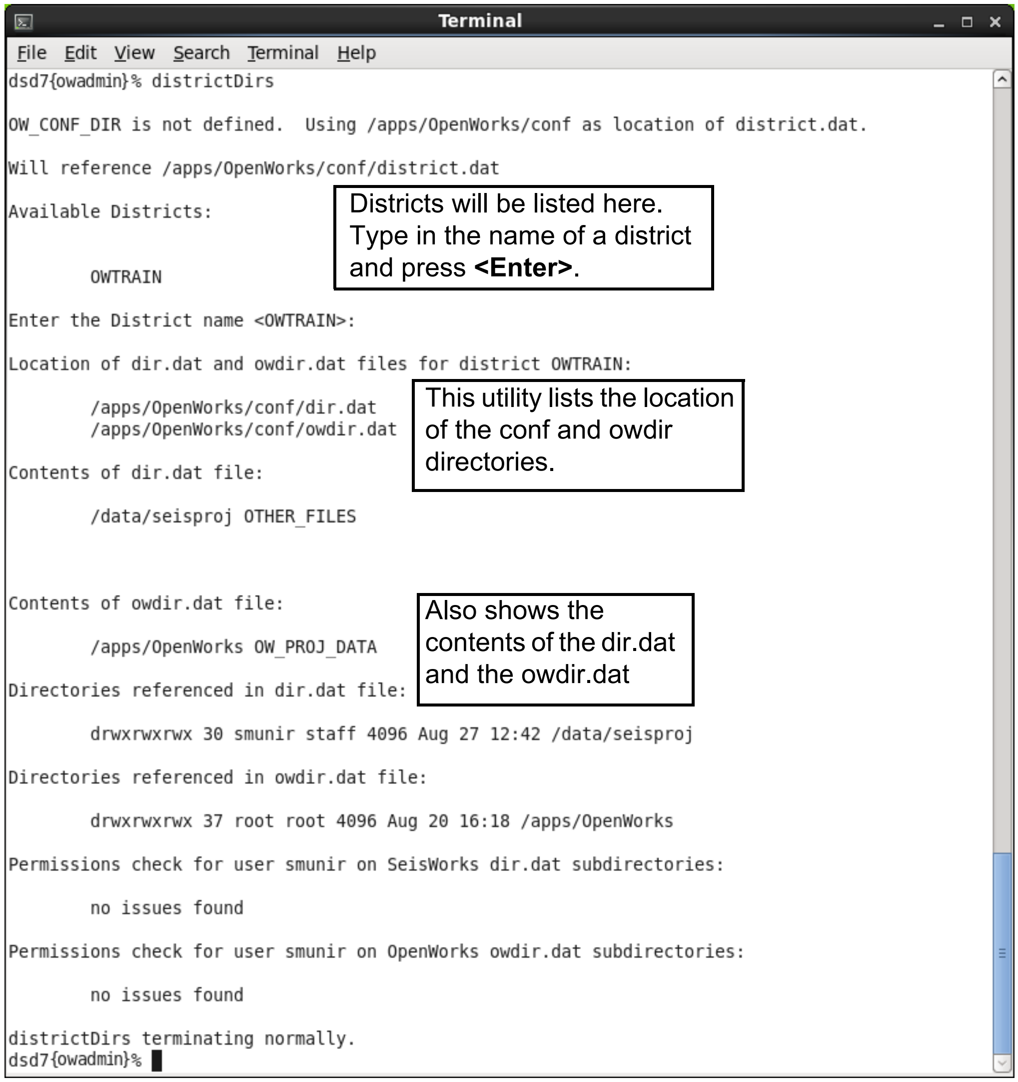
Some of these commands have been used previously in this class. This table is included so that you know they are available. An optional exercise follows to show you how to access and use the commands.

Optional Exercise: Using Command Line Utilities

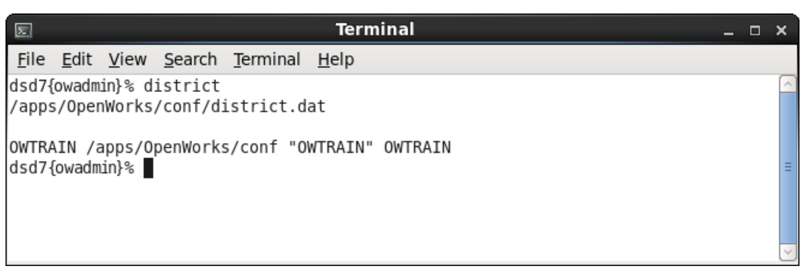
The information in your project may look different than the information reported in this exercise depending on how many workshops you have finished.

1. Open a Terminal Window (from the OpenWorks command menu select **System > Terminal Window**).

2. Type `districtDirs` at the prompt.



3. Type `district` at the prompt.



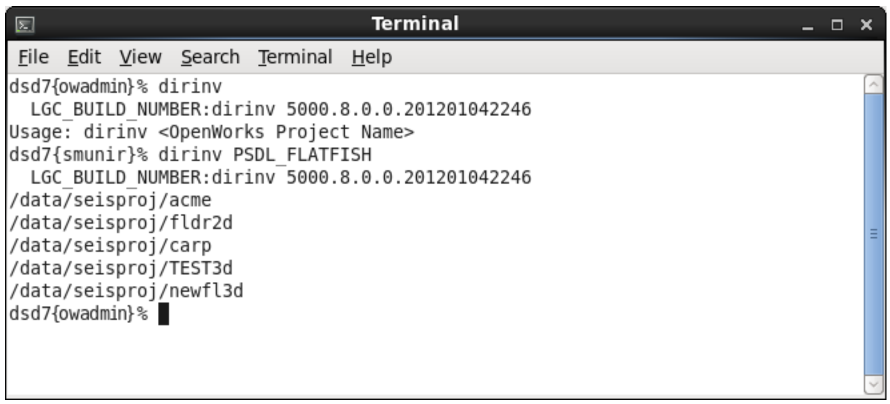
Lists the contents of the `district.dat` file.

4. Type `dirinv` at the prompt.

   Lists the full path to all directories where catalogued files reside for an OpenWorks project.

   Some commands require more input than just typing the name of the command. If this is the case, when the command is entered a usage line is displayed telling you what additional information the command needs. For the dirinv command you must also specify the OpenWorks project name.

5. Type `dirinv PSDL_FLATFISH` at the prompt.



6. Type `getowdirs` at the prompt.

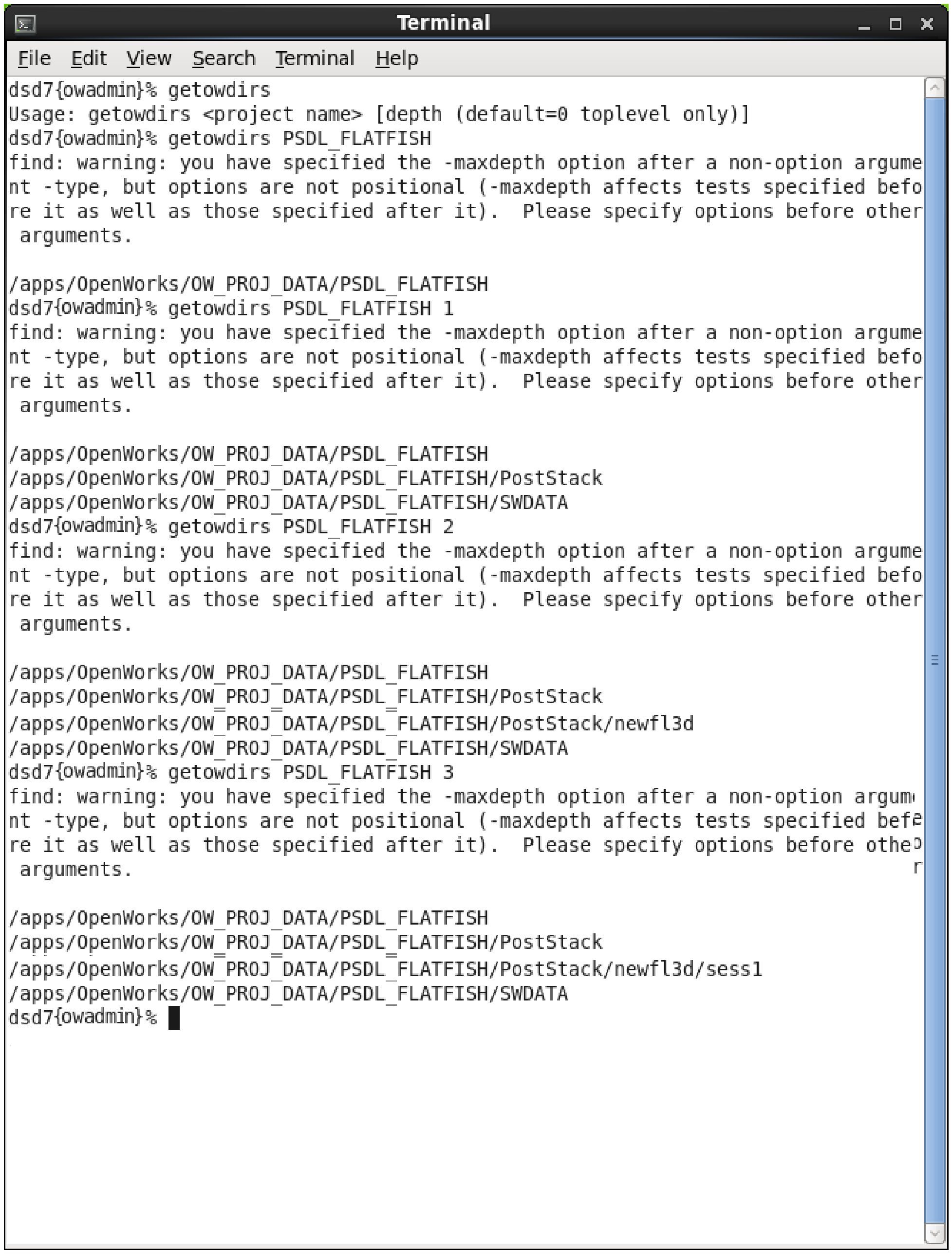
   The *getowdirs* command requires more information and also has a *depth* specification. The depth refers to how deep to list directory paths.

7. Type getowdirs `PSDL_FLATFISH` at the prompt.

   Then, if you want, try some numbers for the depth.

   - Type `getowdirs PSDL_FLATFISH 1` at the prompt.
   - Type `getowdirs PSDL_FLATFISH 2` at the prompt.

- Type getowdirs `PSDL_FLATFISH 3` at the prompt.

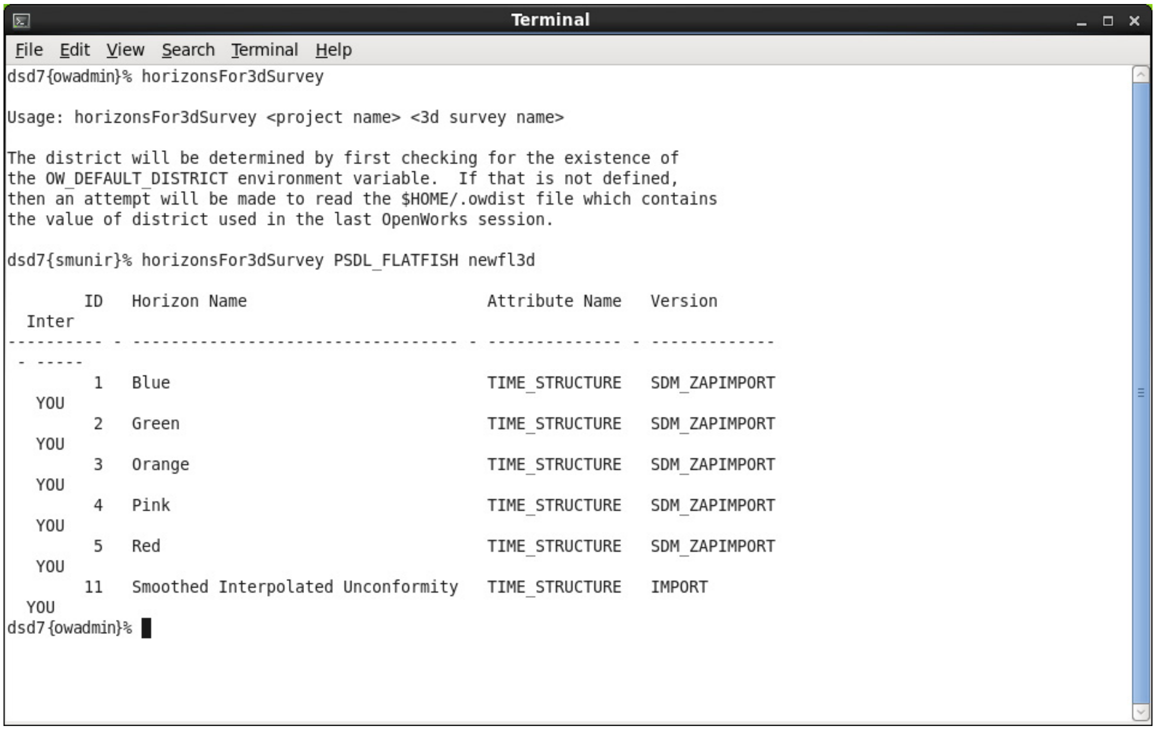


```
dsd7{owadmin}% getowdirs
Usage: getowdirs <project name> [depth (default=0 toplevel only)]
dsd7{owadmin}% getowdirs PSDL_FLATFISH
find: warning: you have specified the -maxdepth option after a non-option argume
nt -type, but options are not positional (-maxdepth affects tests specified befo
re it as well as those specified after it).  Please specify options before other
 arguments.

/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH
dsd7{owadmin}% getowdirs PSDL_FLATFISH 1
find: warning: you have specified the -maxdepth option after a non-option argume
nt -type, but options are not positional (-maxdepth affects tests specified befo
re it as well as those specified after it).  Please specify options before other
 arguments.

/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH
/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH/PostStack
/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH/SWDATA
dsd7{owadmin}% getowdirs PSDL_FLATFISH 2
find: warning: you have specified the -maxdepth option after a non-option argume
nt -type, but options are not positional (-maxdepth affects tests specified befo
re it as well as those specified after it).  Please specify options before other
 arguments.

/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH
/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH/PostStack
/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH/PostStack/newfl3d
/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH/SWDATA
dsd7{owadmin}% getowdirs PSDL_FLATFISH 3
find: warning: you have specified the -maxdepth option after a non-option argum
nt -type, but options are not positional (-maxdepth affects tests specified bef
re it as well as those specified after it).  Please specify options before othe
 arguments.                                                                     r

/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH
/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH/PostStack
/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH/PostStack/newfl3d/sess1
/apps/OpenWorks/OW_PROJ_DATA/PSDL_FLATFISH/SWDATA
dsd7{owadmin}%
```

8. Type `horizonsFor3dSurvey` at the prompt.

   For this command you also need to specify the OpenWorks project name and the 3D survey.

9. Type `horizonsFor3dSurvey PSDL_FLATFISH newfl3d` at the prompt.




```
dsd7{owadmin}% horizonsFor3dSurvey

Usage: horizonsFor3dSurvey <project name> <3d survey name>

The district will be determined by first checking for the existence of
the OW_DEFAULT_DISTRICT environment variable.  If that is not defined,
then an attempt will be made to read the $HOME/.owdist file which contains
the value of district used in the last OpenWorks session.

dsd7{smunir}% horizonsFor3dSurvey PSDL_FLATFISH newfl3d

        ID   Horizon Name                         Attribute Name   Version
  Inter
---------- - -------------------------------- - ------------- - ------------
 - -----
         1   Blue                                 TIME_STRUCTURE   SDM_ZAPIMPORT
   YOU
         2   Green                                TIME_STRUCTURE   SDM_ZAPIMPORT
   YOU
         3   Orange                               TIME_STRUCTURE   SDM_ZAPIMPORT
   YOU
         4   Pink                                 TIME_STRUCTURE   SDM_ZAPIMPORT
   YOU
         5   Red                                  TIME_STRUCTURE   SDM_ZAPIMPORT
   YOU
        11   Smoothed Interpolated Unconformity   TIME_STRUCTURE   IMPORT
  YOU
dsd7{owadmin}%
```

This utility lists the horizons for the specified 3D survey.

10. Type `listLines` at the prompt.

This command also needs the project name.

11. Type `listLines PSDL_FLATFISH` at the prompt.

```
Terminal
File  Edit  View  Terminal  Tabs  Help
trn01{student}% listLines

Usage: listLines <project name>

The district will be determined by first checking for the existence of
the OW_DEFAULT_DISTRICT environment variable.  If that is not defined,
then an attempt will be made to read the $HOME/.owdist file which contains
the value of district used in the last OpenWorks session.

trn01{student}% listLines PSDL_FLATFISH

        ID   Line Name   Storag   Trimmed Min Trace   Trimmed Max Trace   Overall Min Trace   Overall Max Trace
---------- - --------- - ------ - ----------------- - ----------------- - ----------------- - -----------------
         4   G89A-1027   fldr2d                1001                2067                1001                2067
         5   G89A-1028   fldr2d                1001                2142                1001                2142
         6   G89A-1029   fldr2d                1001                2442                1001                2442
         7   G89A-1030   fldr2d                1001                1996                1001                1996
         8   G89A-1031   fldr2d                1001                2444                1001                2444
         9   G89A-1032   fldr2d                1001                2398                1001                2398
        10   G89A-1033   fldr2d                1001                1986                1001                1986
        11   G89A-1034   fldr2d                1001                2066                1001                2066
        13   FL3IL-39    acme                     1                 452                   1                 452
        14   FL3IL-57    acme                     1                 452                   1                 452
        15   FL3IL-107   acme                     1                 452                   1                 452
        16   FL3XL-240   acme                     1                 129                   1                 129
        17   FL3XL-309   acme                     1                 129                   1                 129
        18   FL3XL-394   acme                     1                 129                   1                 129
trn01{student}%
```

Try some of the other command line utilities if you like.