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Chapter 5

Loading ASCII Curve Data

The OpenWorks software Curve Loader allows you to load files containing ASCII or binary curve data, including well logs, directional surveys, position logs, synthetic seismograms, and time-depth tables. This chapter specifically explains how to deal with curves in ASCII format.

A later chapter deals with the loading of binary curve data.

When loading ASCII curve data, as with ASCII well data, two main steps are involved:

- Defining the structure of the file
- Defining the fields to be loaded

In ASCII Well Loading, the structure of the file is described as either a constant number of lines per well or a variable number of lines per well. The organization of curve data brings into play four determinations:

- Whether it is serial or multiplexed
- Whether changes in the format are identified by count or a marker
- Identifying well delimiters
- Identifying curve delimiters

Chapter Objectives

In this chapter you will:

- Learn about the format of ASCII curve files
- Format and load serial well log curves
- Format and load multiplexed well log curves
- View loaded curves with the Well Curve Viewer
- Verify the loaded curves with the Well Data Manager
- Format and load angular directional survey data
- Format and load position logs

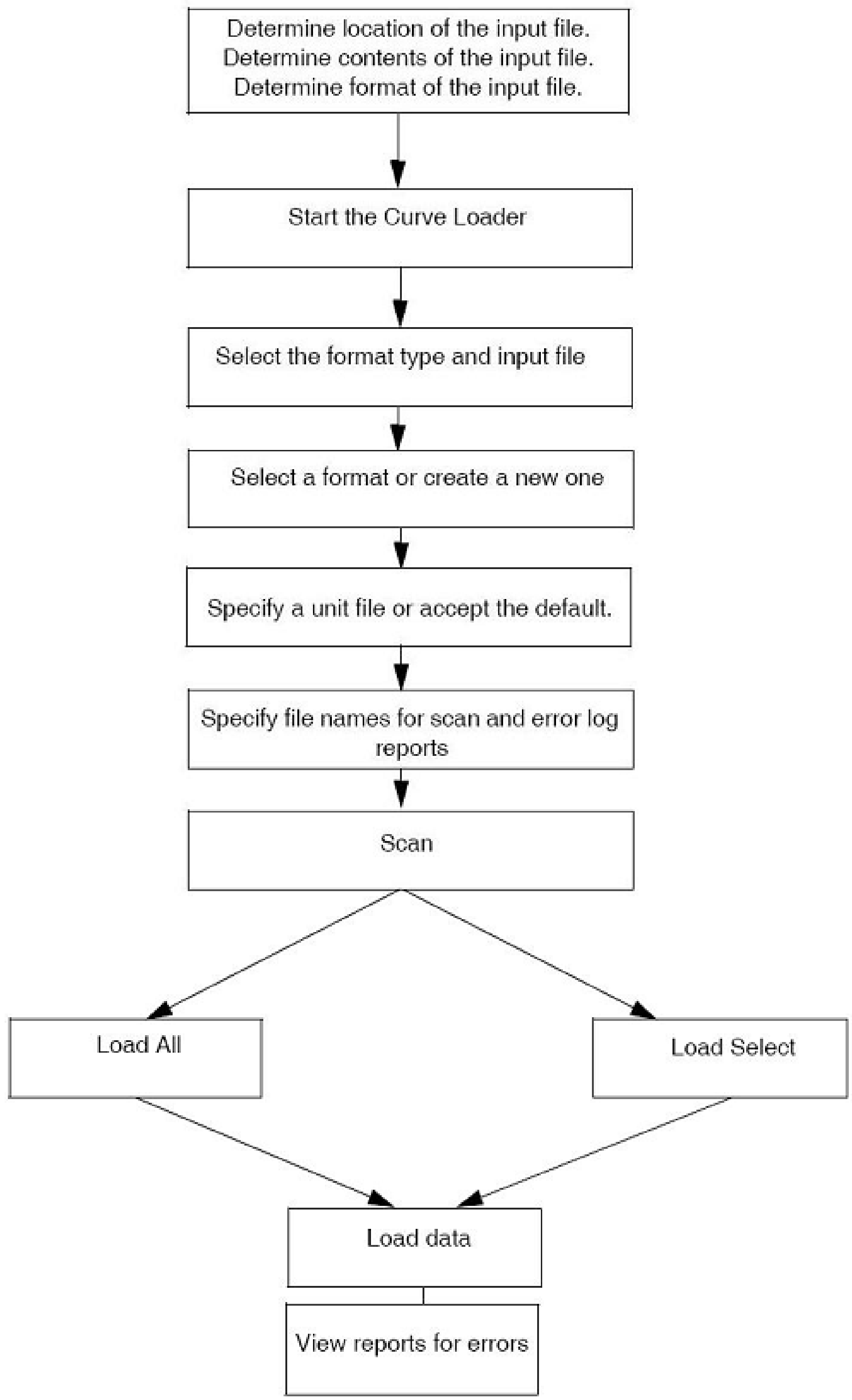
Curve Loading Overview

The Curve Loader loads well log curves into the database. In particular, the Curve Loader lets you:

- Load data from a local tape or network disk drive using either:
  - **LIS** - the Log Information Standard format developed by Schlumberger (binary).
  - **DLIS** - the Digital Log Interchange Standard is a data storage format that contains multidimensional data objects. It was developed by Schlumberger (binary).
  - **LAS** - the Log ASCII Standard designed by the Canadian Well Logging Society for log data on floppy disks.
  - **BIT** - the Bit Scan format developed by Western Atlas (binary).
  - **ASCII** - the American Standard Code for Information Interchange, in which files are stored as plain text rather than as encrypted binary files.
- Scan the data to be loaded.
- Load all curves or only a selected list of curves.
- Automatically add any new well names to the database and add undefined curve types to the Curve Dictionary (if desired).
- View header information and other details of the tape.

To load curves, you must first create or edit a format so that the program can locate the data correctly. This activity is very similar to the one followed for ASCII well loading. Once you have a format, you can use it for all data files with the same structure. Landmark also provides predefined formats for certain types of curve files.

General Curve Loading Workflow



Characteristics of Data

The OpenWorks Curve Loader loads well log curves, angular directional surveys, position logs, synthetic seismograms, and time-depth tables. Each of these data types has general characteristics that affect data loading. Characteristics of these data types are described using these terms:

- **Record** - A record is the logical structure in the input file that contains fields. This is often a single line.
- **Field** - A field is a single data value.
- **Serial** - Curve data is serial if values for only one curve appear on a record. Each record may contain a single value for a single depth for one curve, or multiple values for multiple depths for one curve.
- **Multiplexed** - Curve data is multiplexed if values for several curves appear on a record. Each value pertains to the same depth.

Organization of ASCII Well Log Curves

To determine the organization of an ASCII well log curve input file, ask three questions:

1. Is the data serial or multiplexed?

2. Are the records identified by **count** or by **marker**?

3. Is the data acquisition or composite?

These components of an ASCII well log curve input file are explained in the pages that follow.

Overview of Well Log Curve Requirements

- The Curve Loader loads all standard types of well log curves: gamma ray, conductivity, resistivity, lithology, porosity, permeability, and so on.

- Only one depth measurement can appear on a record.

- Depth can be accompanied by values at the depth for one or more curves. Well log data can be loaded as either serial or multiplexed.

- In serial format with evenly sampled data, the depth can be followed by several measurements from the same curve.

- If no depth is present on the curve data records, the top depth and sample interval must be present.

Identifying Serial Curve Data

In **serial** curve data, *one or more values for one curve* are shown on a single line (one curve per record), as in the following examples:

```
B&P EXPLORATION #2     60558031660    FEET
Depth             GR
4939.000      -888.0
4939.500        88.1
4940.000        87.0
4940.500        90.1
4941.000        94.6
.
.
.
.
```

```
B&P EXPLORATION #1    62592073185    FEET
GR  4939.000   17548.000   0.500   -888.0
4939.000      -888.0      -888.0    64.1     70.9     79.4    85.3
4942.000        88.1        88.2   162.0    148.0    134.0   132.0
4945.000       127.0       105.0    88.6     81.5     91.8   102.2
4948.000       110.1        95.6    92.4     89.9     90.4    90.7
4951.000        94.6        93.2    88.9     95.1     98.0   101.7
.
.
.
.
```

Identifying Multiplexed Curve Data

In **multiplexed** data, values for one or more curves are shown on each line (multiple curves per record). In the following example, each record contains values for the curves GR, SP, ILD, ILM, NPHI and RHOB.

```
B&P EXPLORATION #2    60558031660    FEET
Depth            GR         SP     ILD     ILM     NPHI    RHOB
4939.000     -888.0     -888.0     4.1     4.9     19.4     2.3
4939.500       88.1      -88.2     2.0     2.3     14.0     2.0
4940.000       87.0      -85.0     8.6     9.5     11.8     2.2
4940.500       90.1      -95.6     2.4     3.9     10.4     2.7
4941.000       94.6      -93.2     8.9     9.1     13.0     2.7
.
.
.
.
```

```
B&P EXPLORATION #2     60558031660    FEET
Depth             GR
4939.000      -888.0
4939.500        88.1
4940.000        87.0
4940.500        90.1
4941.000        94.6
.
.
.
.
```

Identifying Curve Records by Count

In curve data identified by *count*, records are identified by their numerical position within the file. For example, records would be identified by count if the first record contained the well name, the second contained top depth, bottom depth, and sample rate, and so on.

```
**** COMPANY      : ZYCOR Oil Company
**** WELL         : Zycor #31
**** COUNTY       : Travis
**** STATE        : Texas
**** COUNTRY      : USA
**** UWI NUMBER   : ZUWI31
**** DEPTH RANGE  :   2500.000  -  4000.000 @ 4.000 / F
DEPTH             SN       SP
  2500.000     2.414   -12.359
  2500.250     2.527   -12.199
  2500.500     2.613   -12.122
  2500.750     2.606   -12.291
  2501.000     2.614   -12.378
  2501.250     2.667   -12.209
  2501.500     2.706   -12.122
.
.
.

  3999.750     2.633   -12.209
  4000.000     2.594   -12.081

**** COMPANY      : Zycor Oil Company
**** WELL         : Zycor #32
**** COUNTY       : Travis
**** STATE        : Texas
**** COUNTRY      : USA
**** UWI NUMBER   : ZUWI32
**** DEPTH RANGE  :   2500.000  -  4000.000 @ 4.000 / F
DEPTH             SN       SP
  2500.000     5.306   -27.477
  2500.250     5.053   -26.687
  2500.500     4.827   -25.859
  2500.750     4.684   -24.949
  2501.000     4.554   -23.944
  2501.250     4.457   -22.672
  2501.500     4.346   -21.291
.
.
.
  3999.750     4.024   -16.490
  4000.000     3.980   -15.204
```

Identifying Curve Records by Marker

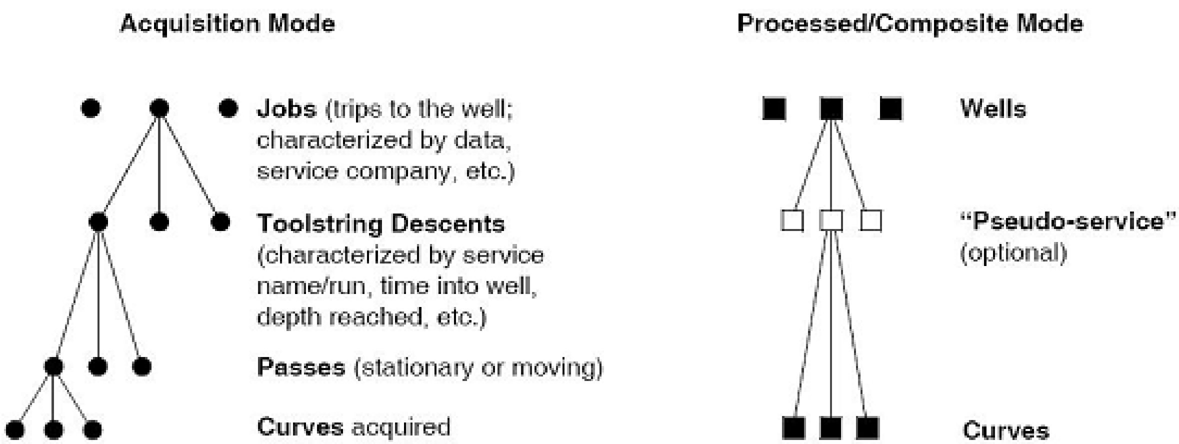
In curve data identified by *marker*, markers are used to define differences in format. In the example shown below, the marker “AA” identifies a new well, the marker “BB” identifies the curve name, and the marker “CC” identifies lines containing the depth and curve values.

```
AA:UWI19
BB:LN                              F
CC:1520.00   1.4000
CC:1520.50   1.5000
CC:1521.00   1.7000
CC:1521.50   1.9000
CC:1522.00   1.9000
CC:1522.50   1.9000
CC:1523.00   2.0000
CC:1523.50   2.1000
CC:1524.00   2.1000
CC:1524.50   2.1000
CC:1525.00   2.2000
CC:1525.50   2.3000
CC:1526.00   2.3000
CC:1526.50   2.3000
CC:1527.00   2.4000
CC:1527.50   2.3000
CC:1528.00   2.4000
.
.
```

Acquisition vs. Processed/Composite Data

You should load data as acquisition data if the data can be associated with a specific “pass” of a logging tool in the wellbore and if, because of that association, the data will be easier to manage, process, and edit.

The required information for acquisition data is a service name and run number, which characterize each toolstring descent and a name for each logging pass made by that toolstring on descent. If, on the other hand, log data is processed, interpreted, or cannot be associated with a specific logging tool pass, you should load it as composite/processed data. The differences between the acquisition and the processed/composite models are shown schematically in the diagram below. Also see the detailed discussion of five-key curve naming scheme in the *Petroworks Software Basics* chapter in the *Introduction to PetroWorks Family of Products* manual to see how the curve model is exposed in the curve name.



The acquisition model is designed for wireline/LWD data and corresponds to the physical, operation aspects of data acquisition.

The processed/composite model is designed for general wellbore curve data. It could be processed data such as a water saturation curve or it could be from nonlogging sources such as core, well test, paleo, etc.

How Curve Loader Handles Units of Measurement

Curves are handled differently from other data in the OpenWorks software. Curve loading and exporting are not subject to the units handling of either the project or the session measurement system.

When the loader creates a curve instance in the database, the unit file does not contain an entry for the unit, or if the unit file does not map a particular unit mnemonic to a unit recognized in the current session, then no unit will be loaded. The external unit of the curve, which is mapped to a valid OpenWorks unit via the unit mapping file, is placed in the Curve Units field of Well Data Manager.

If the curve name is not in the Curve Dictionary, the loader creates an entry in the Curve Dictionary using a valid OpenWorks unit for the curve (mapped from the external unit via the unit file).

The loader also supplies the base unit type of the curve in the Curve Dictionary so that conversions take place correctly between different systems of measurement. However, the base unit type supplied by Curve Loader's unit file may not always give the best conversion. You must inspect curve units after loading to ensure that the correct unit type is associated with your curve data. You can also modify the unit file before loading, but you should inspect the curve units and base unit types after loading. Inspect and change unit types for curves in the OpenWorks Curve Dictionary.

Using a correctly and completely defined unit file when loading data ensures that problems with unit types, units, and left and right scales do not occur.

Warning

Do not load porosity curves without units.

If you do not define mappings for your porosity units in the unit.UNIT file, you may have problems with the loaded porosity or volumetric data, since the units may be decimal (v/v decimal, deci, etc.) or porosity units (PU, pu, P.U., p.u., etc.) or ratio (%, SU, etc.).

For example, NPHI is a neutron porosity curve, and it is defined in OpenWorks Curve Dictionary with a default of v/v decimal. Therefore, if an input NPHI curve has no defined units, then the OpenWorks software automatically assigns the default unit v/v decimal, which may be incorrect for your curve. You can determine this by inspection of the minimum and maximum values for the curve in Well Data Manager. If either or both values exceed 1, then the NPHI curve is probably measured in porosity units. If the minimum/maximum values do not exceed 1, the curve is most likely measured in v/v decimal units. You can also use tabular listing to see if the means (averages) are greater than 1, or you can examine the curve with Well Curve Viewer displaying Storage Units.

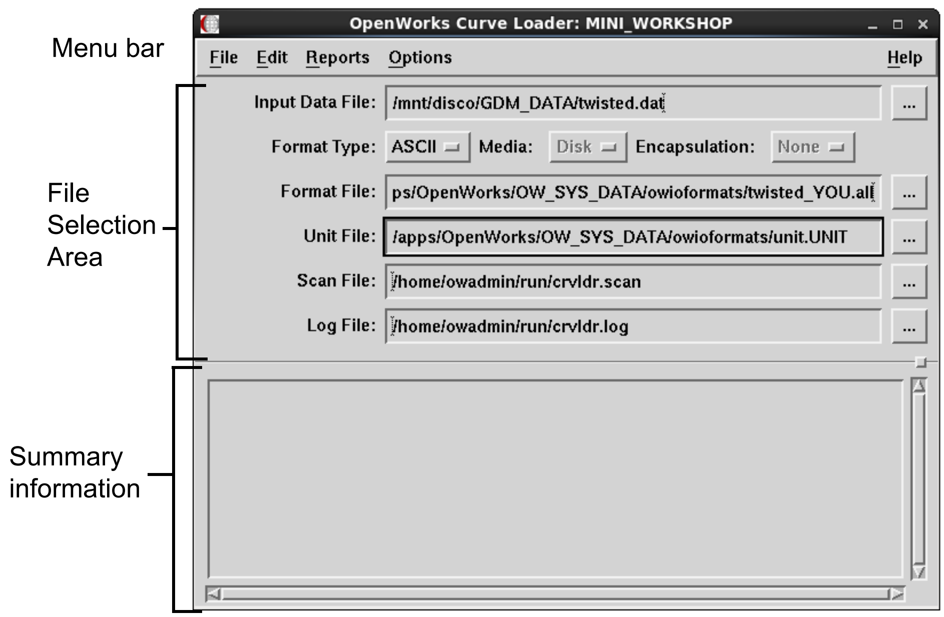
To avoid problems, before loading explicitly map all units in the unit.UNIT file. If you are unsure of the unit, examine the magnitude of any porosity or volumetric curves on the data tape/file by examining the preload scan report. If you do load porosity curves without units, you can edit the unit entry in the Curve Dictionary.

ASCII Curve Formats

Loading ASCII curve data is similar to loading ASCII well data in that both forms of data require you to select or create a format file in which the organization of the data is defined.

Access the Curve Loader from the OpenWorks Command Menu by selecting **Data > Import > Curve Import (Classic)**.

The main window of the Curve Loader displays, as shown below:



All Curve Formats should have an *.all* extension.

Selecting a Predefined Format for ASCII Curves

To load ASCII curves, you must create a format to describe your data, or select a pre-defined format supplied by Landmark.

The Landmark-supplied ASCII curve formats are in the same *owioformats* directory as the Landmark-supplied well data loader formats. Recall that owioformats is found under the **OW_SYS_DATA** directory. The following chart gives descriptions of the Landmark supplied ASCII curve-loading formats.

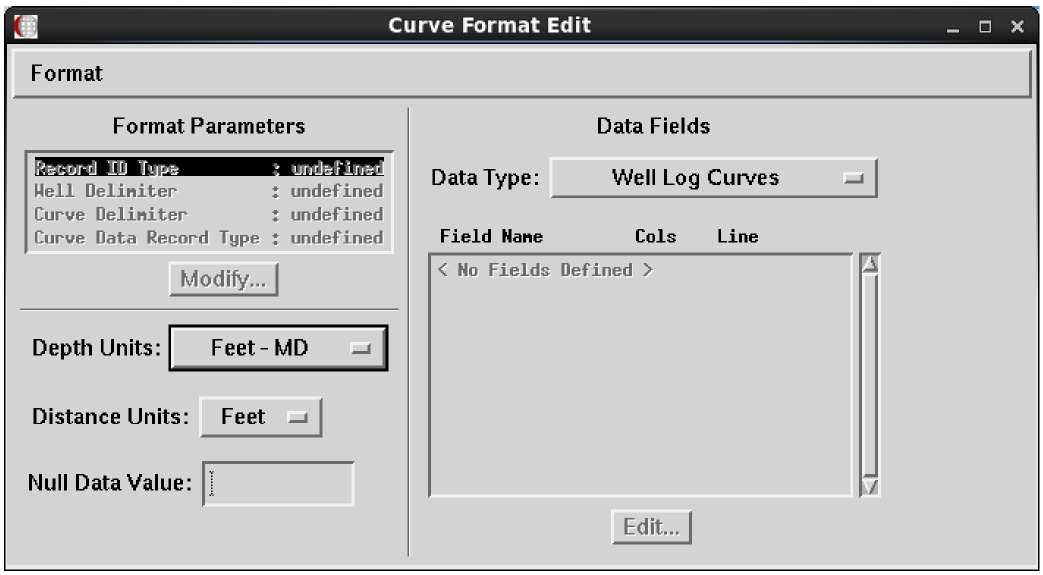
File Name	Format Description
IHS29DirSurvQR.all	Loads HIS 297 formatted directional survey.
owxDirSurv.all	Loads directional survey data. Matches the equivalent *.wlx* file.
owxLog.all	Loads log curve data, including multi-well, multi-log files. Matches the equivalent *.wlx* file.
owxPosLog.all	Loads position log data. Matches equivalent *.wlx* file.
owxSyn.all	Loads synthetic seismic data. Matches the equivalent *.wlx* file.
owxTimeDepth.all	Loads time depth tables. Matches the equivalent *.wlx* file.

Creating or Editing a Format

If a previously defined format does not describe your input file, you must create or edit a format.

Starting the Curve Format Editor

To start the Curve Format Editor, select **Edit > ASCII Format** from the OpenWorks Curve Loader main window.



The Curve Format Editor has two main fields:

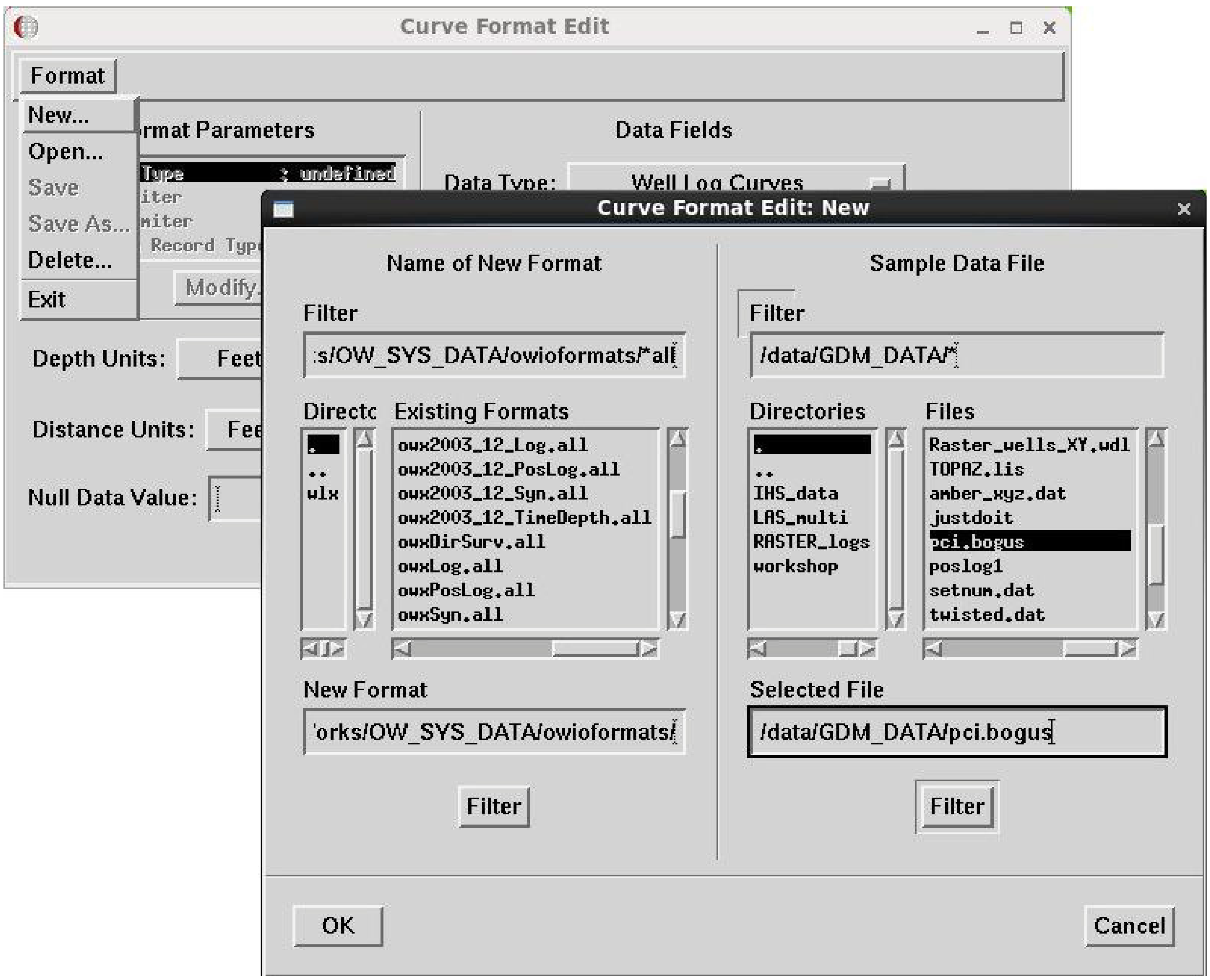
- The **Format Parameters** list on the left side of the window displays the format parameters, units of measurement, and the null data value.
- The **Data Fields** section on the right side of the window lets you select the type of data to be formatted and displays the settings for each field defined for the data type, once they are selected.

Opening or Creating a Format to Edit

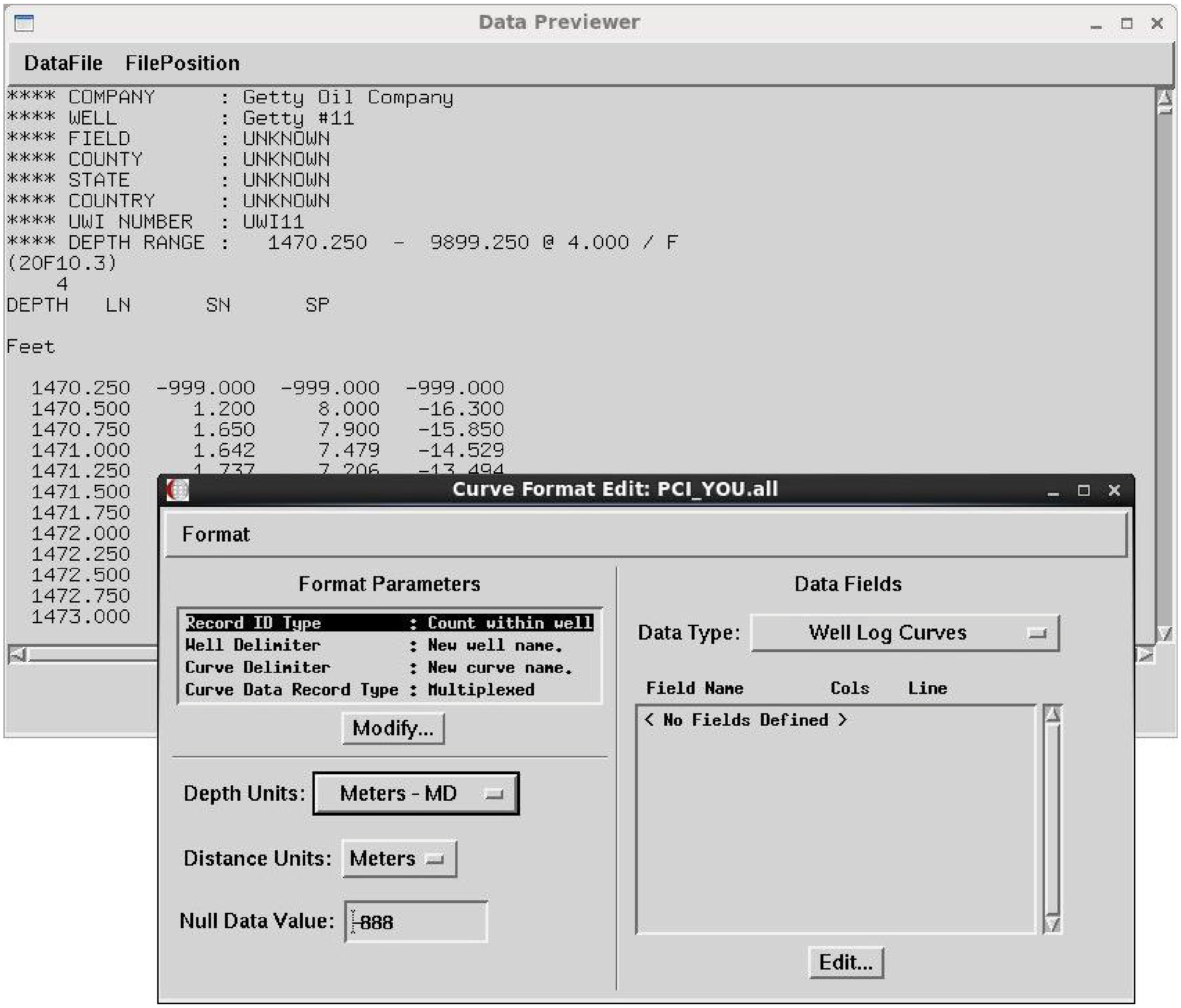
In the Curve Format Edit window, select **Format > New** to create a new format, or select **Format > Open** to select an existing format. If you are creating a new format, type a name for the format in the **New Format** field at the bottom left-hand side of the window. If you are opening an existing format, select it from the **Existing Formats** lists. Landmark predefined formats are located in the `OW_SYS_DATA/` ***`owioformats`*** directory. Store your own formats in a place you can remember.

All formats should be named using the convention `format_name.all`. The Curve Format Edit Existing Formats window automatically filters for files with a *.all* extension.

When creating a new format file or opening a format file, you must also select a data file. Select a Sample Data File (the file containing your data) by entering the name in the **Selected File** box at the bottom right-hand corner of the screen or by finding it with the **Filter** option.



When you click on **OK**, a status box shows the progress in assembling the data. Then, the Data Previewer window displays. You use the Data Previewer window with the Curve Format Edit window to create your curve format.



Two examples of formatting ASCII curve data follow:

- Formatting serial data with markers
- Formatting multiplexed data by count

Each example shows a portion of the input file followed by the procedure for formatting that file.

Formatting Serial Data with Markers

This example shows a log curve data set that is serial and has markers to indicate a change in format.

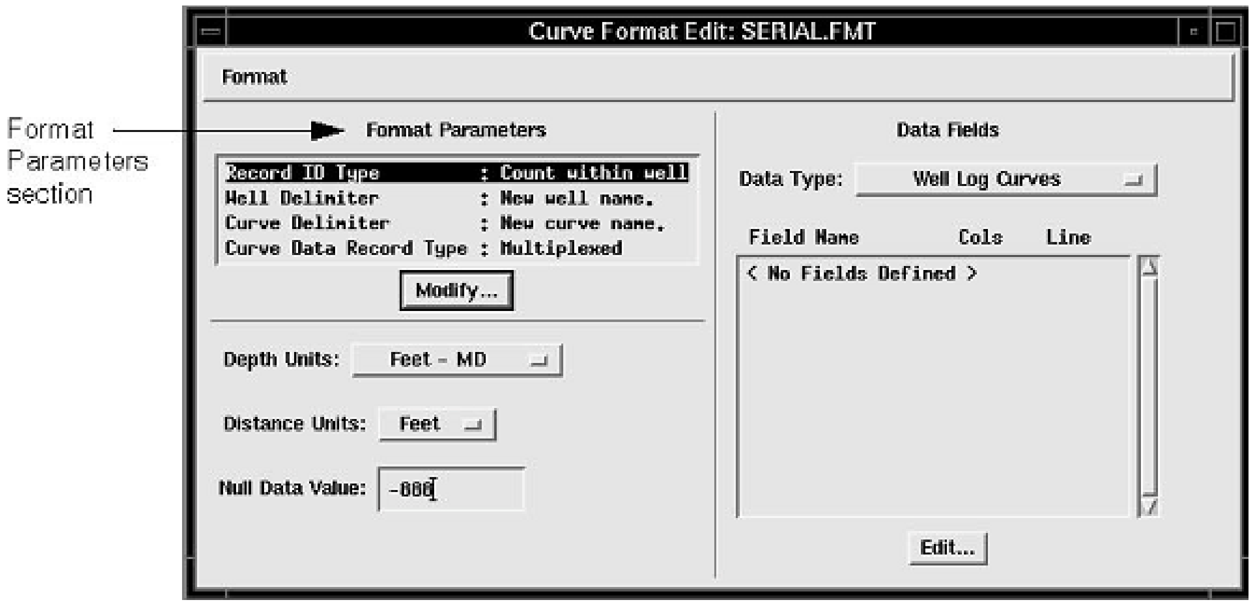
UNIX Window

```
1 #1 RYAN                   300252618800    FEET
2   0
3GR   4939.5000       -888.                          17550.000
4   4939.500    -888.    -888.0    64.1      70.9      79.4      85.3        6
4   4942.500     88.1     88.2     162       148.      134.      132.        6
4   4945.500     127.     105.     88.6      81.5      91.8      102.        6
4   4948.500     107.     110.     95.6      82.4      74.6      71.7        6
4   4951.500     76.2     83.2     88.4      85.5      88.3      91.6        6
.
.
.
4 17542.500     87.4     85.3     89.       91.1      90.2      97.2        6
4 17545.500     99.0     101.     100.3     99.1      95.5      95.1        6
4 17548.500     92.1     94.3     96.8      92.7     -888.     -888.        4
7 END OF CURVE
3DT   4939.500        -888.                          17550.000
4   4939.500     69.4     70.2     70.8      71.4      66.8      62.9        6
4   4942.500     66.3     69.3     63.4      66.9      68.0      67.2        6
4   4945.500     69.1     68.3     65.8      63.7      62.1      61.7        6
4   4948.500     60.4     62.5     64.6      66.1      68.0      69.5        6
4   4951.500     69.4     68.3     67.4      66.2      65.8      64.7        6
.
.
.
4 17542.500     67.3     66.9     65.5      68.7      66.0      67.1        6
4 17545.500     66.4     65.8     66.9      61.8      62.2      64.3        6
4 17548.500     65.7     66.6     68.2      64.3     -888.     -888.        4
7 END OF CURVE
9 END OF LOCATION    300252618800
superman:/home/superman/klz/gdm/alaska/curves>
```

The procedure on the following pages explains how to build and display the format for this file.

Filling Out the Format Parameters

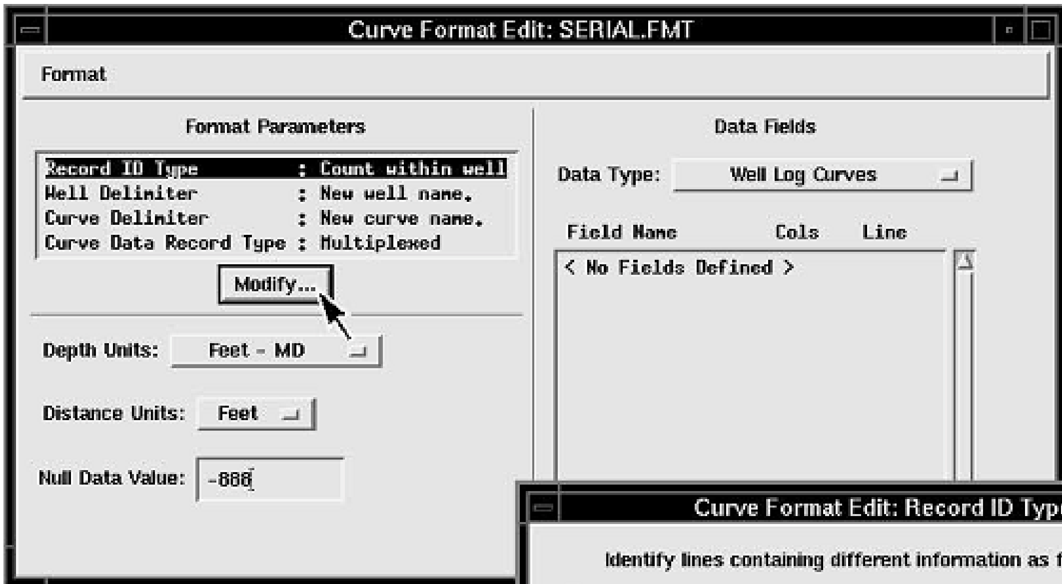
Once an input file is selected and a format file is named, the next step is to define the Format Parameters on the left-hand side of the Curve Format Edit dialog box:

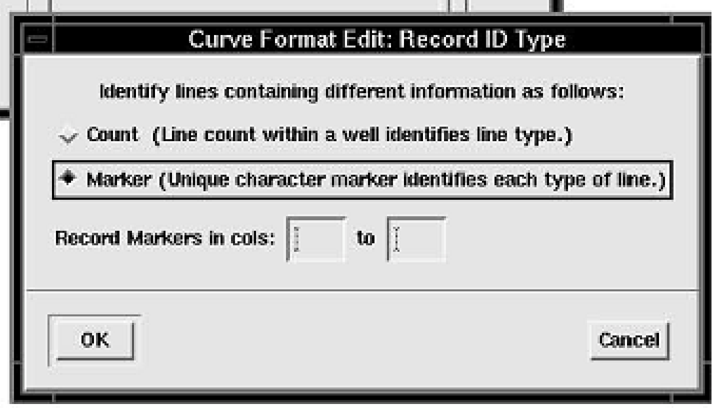


- **Record ID Type** specifies whether lines containing different information are identified by COUNT or MARKER.
- **Well Delimiter** specifies how the end of wells is recognized. Either by a change in well name, a special flag on the last line of each well, or a beginning of well marker.
- **Curve Delimiter** specifies how the end of curves is recognized. Either by a change in curve name, a special flag on the last line of each curve, or a beginning of curve marker.
- **Curve Data Record Type** specifies whether the curve record type is SERIAL or MULTIPLEXED.
- **Depth Units** specify the units that your curve depth measurements are stored in.
- **Distance Units** are only applicable when loading a position log.
- **Null Data Value** specifies the number used as a place holder when no curve value was measured. Record ID Type To set the Record ID Type, click on it and press the Modify button. The Record ID Type box displays.

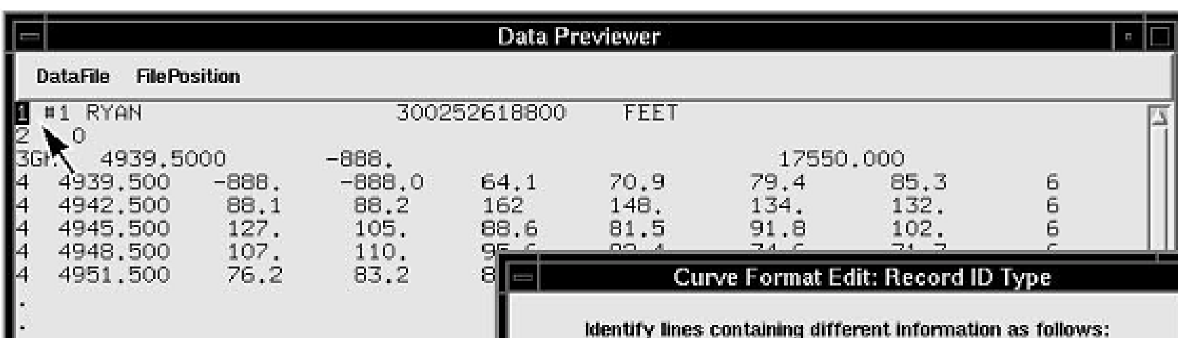
Record ID Type

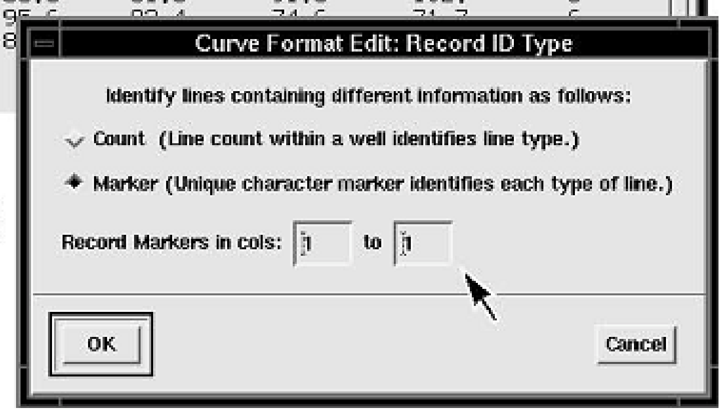
To set the Record ID Type, click it and press the **Modify** button. The Record ID Type box displays.





To modify the Record ID Type, toggle on either **COUNT** or **MARKER**. When Marker is selected, you are prompted to indicate which columns in your data file contain the marker.

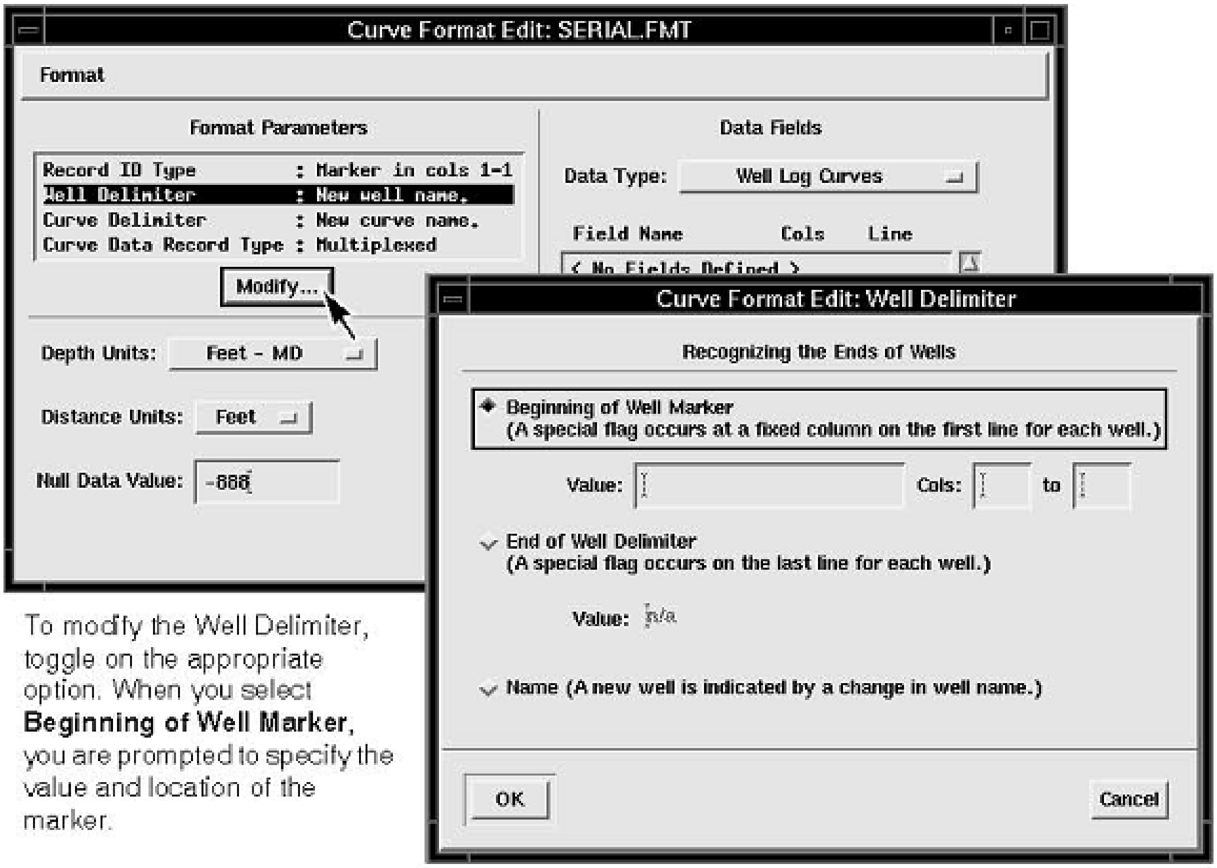




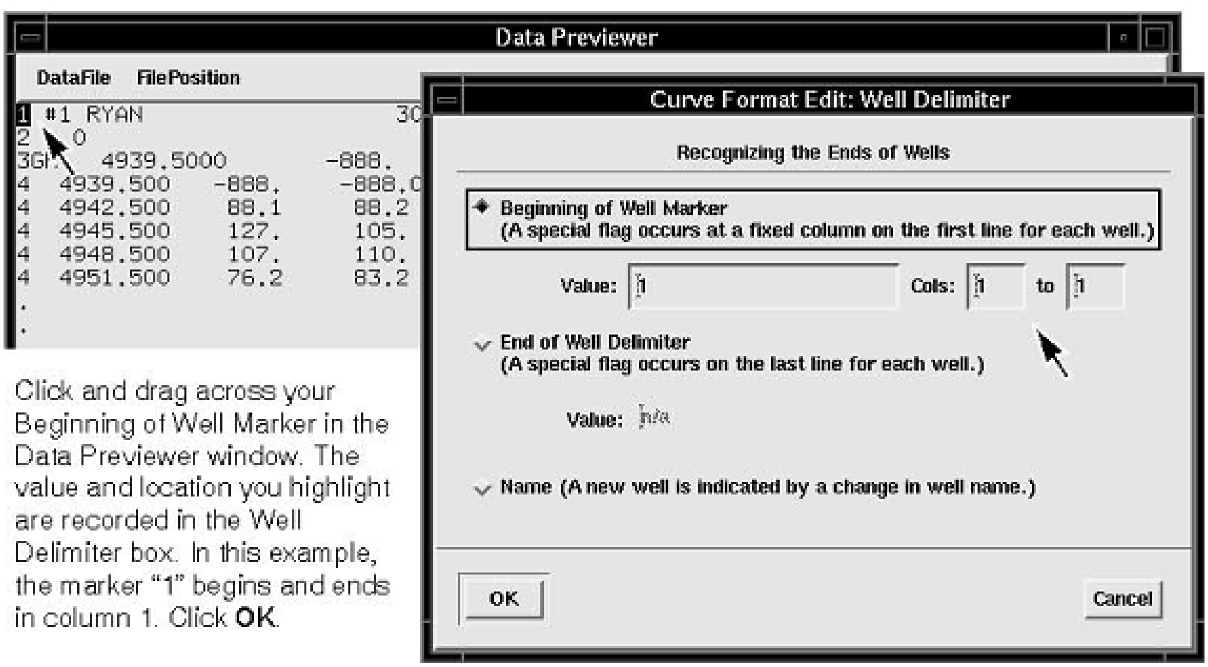
Click and drag across your marker columns in the Data Previewer window. The columns you highlight are recorded in the Record ID Type box. In this example, the marker begins and ends in column 1. Click **OK**.

Well Delimiter

To set the Well Delimiter, click on it and press the **Modify** button. The Well Delimiter box displays.



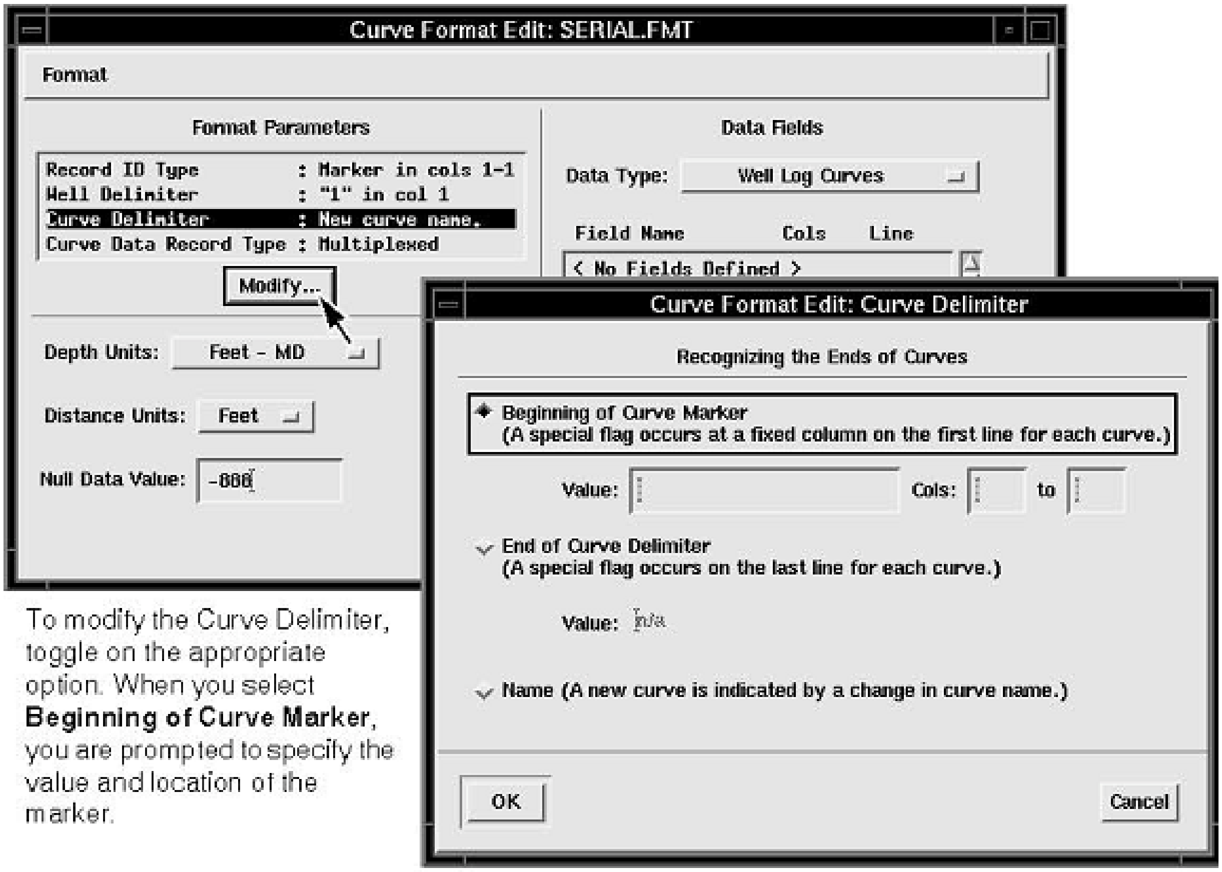
To modify the Well Delimiter, toggle on the appropriate option. When you select **Beginning of Well Marker**, you are prompted to specify the value and location of the marker.

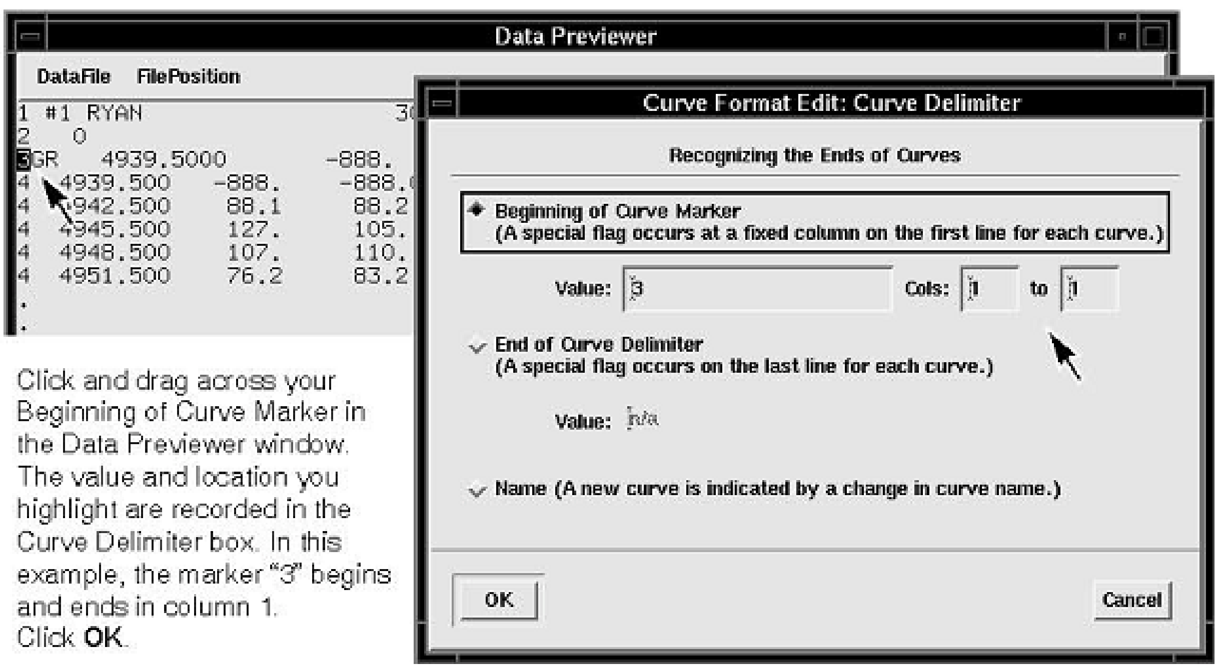


Click and drag across your Beginning of Well Marker in the Data Previewer window. The value and location you highlight are recorded in the Well Delimiter box. In this example, the marker “1” begins and ends in column 1. Click **OK**.

Curve Delimiter

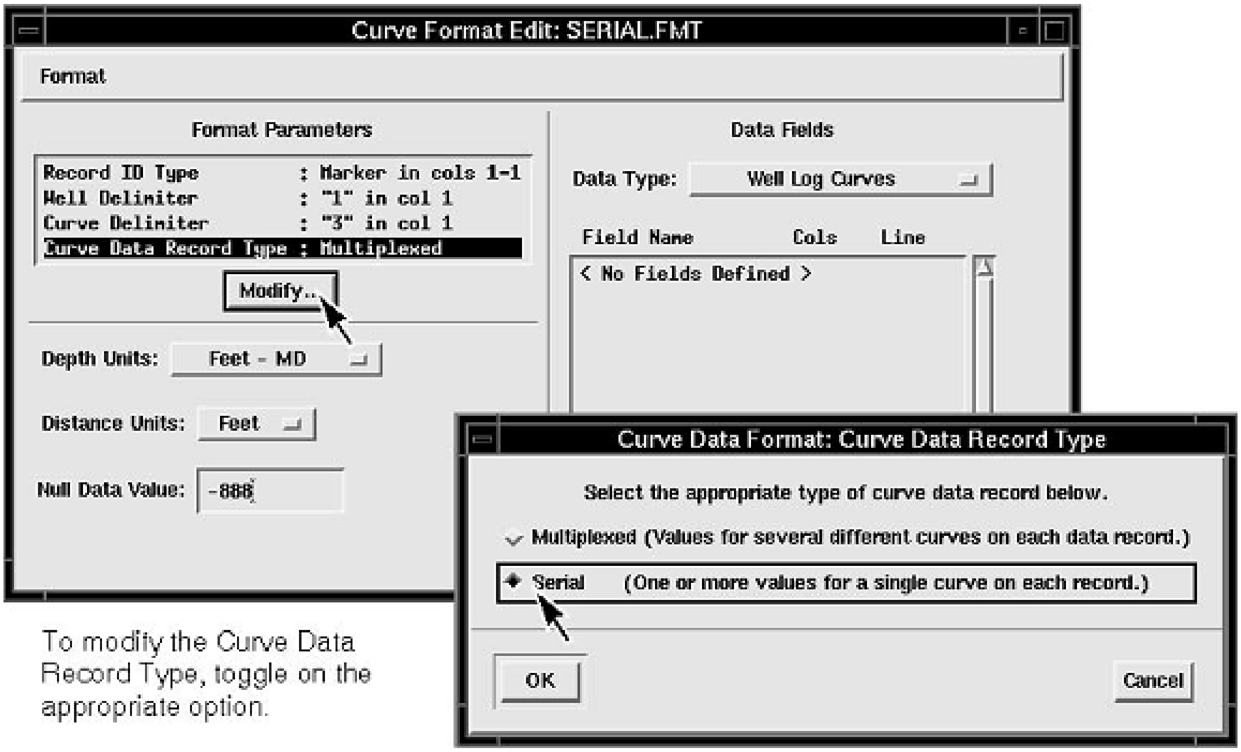
To set the Curve Delimiter, click on it and press the **Modify** button. The Curve Delimiter box displays.



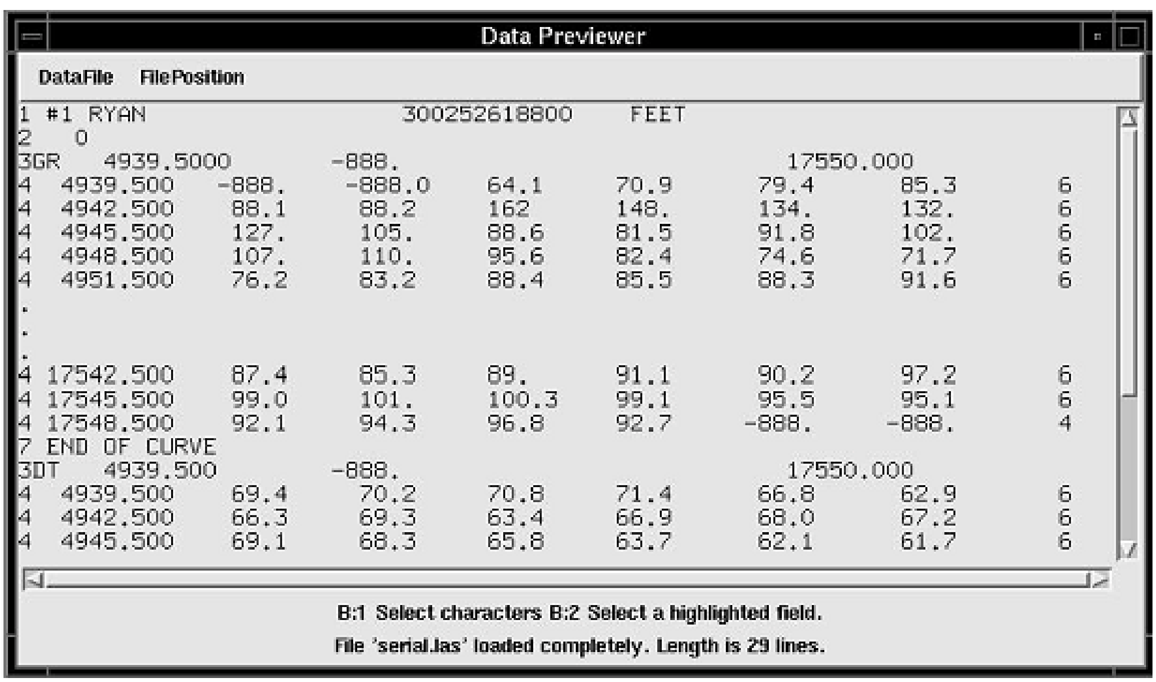


Curve Data Record Type

To set the Curve Data Record Type, click on it and press the **Modify** button. The Curve Data Record Type box displays.

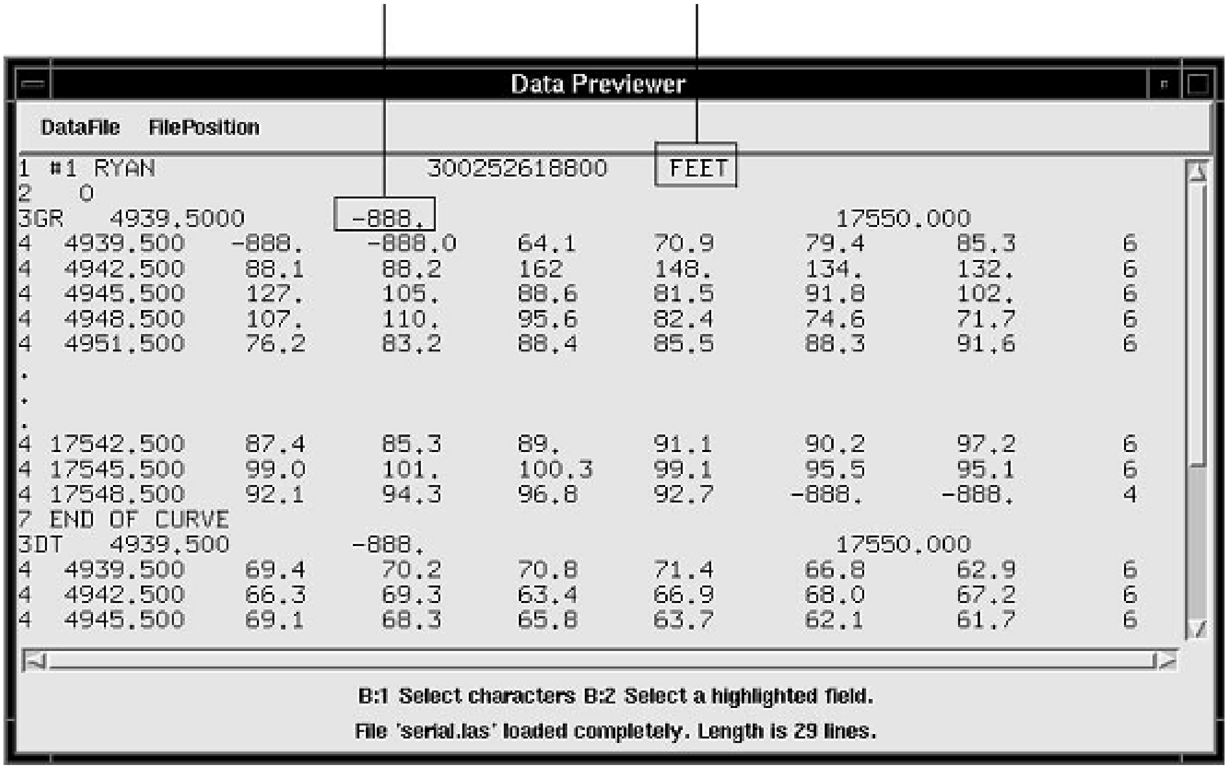


To modify the Curve Data Record Type, toggle on the appropriate option.

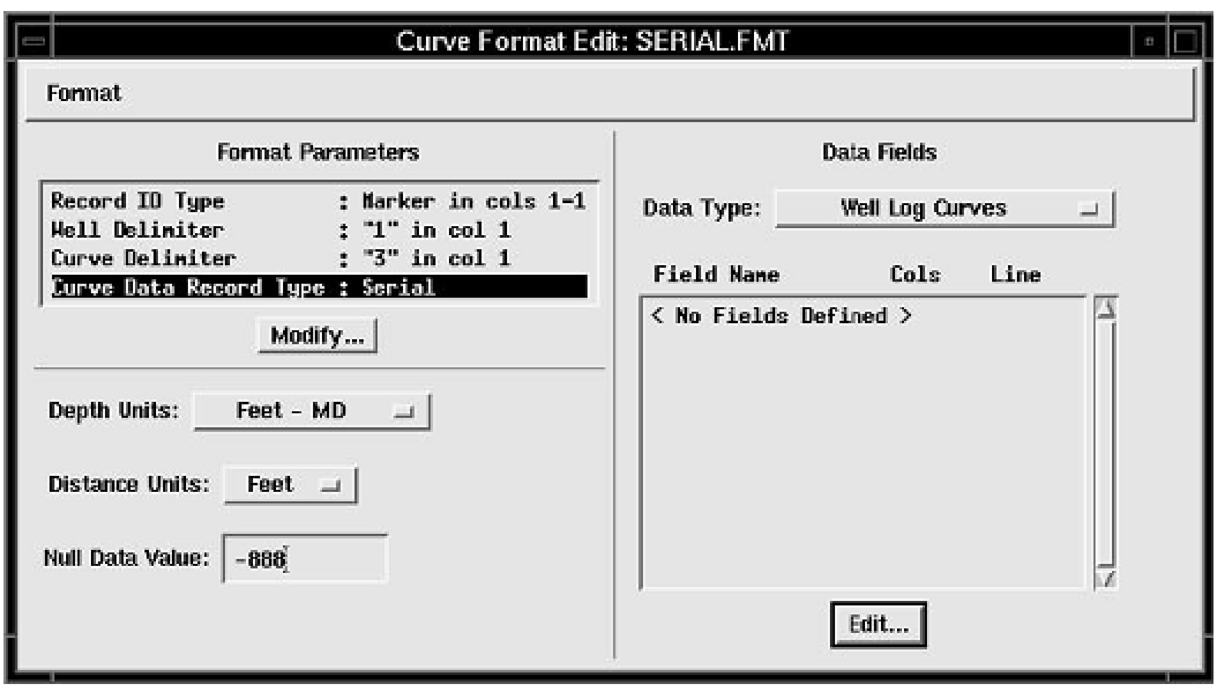


Depth Units and Null Data Value

Depth Units and the Null Data Value are often recorded in the header information of your data file.



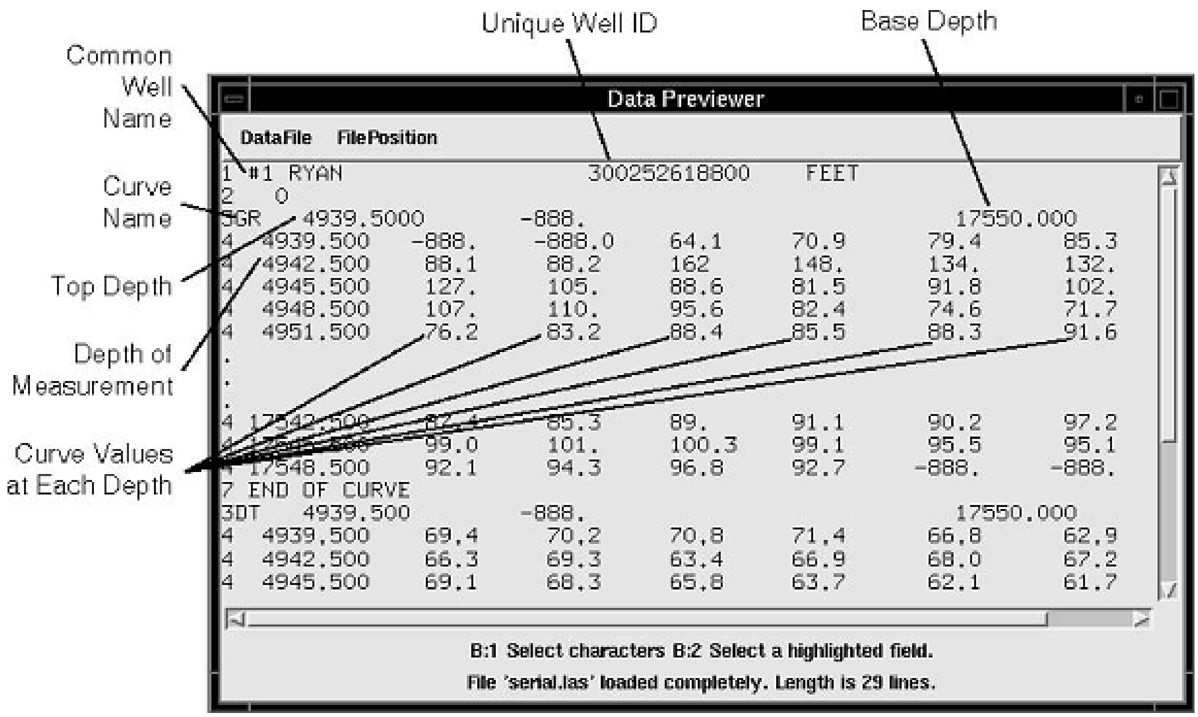
The final Format Parameters section should look like this.



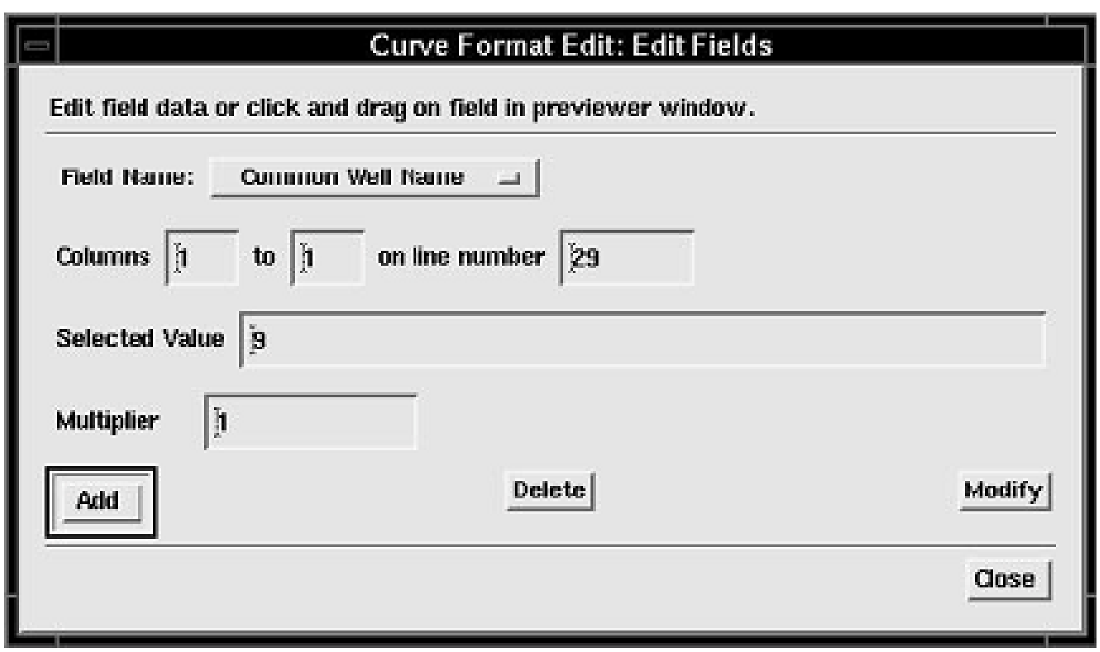
Describing the Data

You describe the data fields for an ASCII curve file in much the same way that you did for the ASCII Well Loader (as explained in Chapter 3).

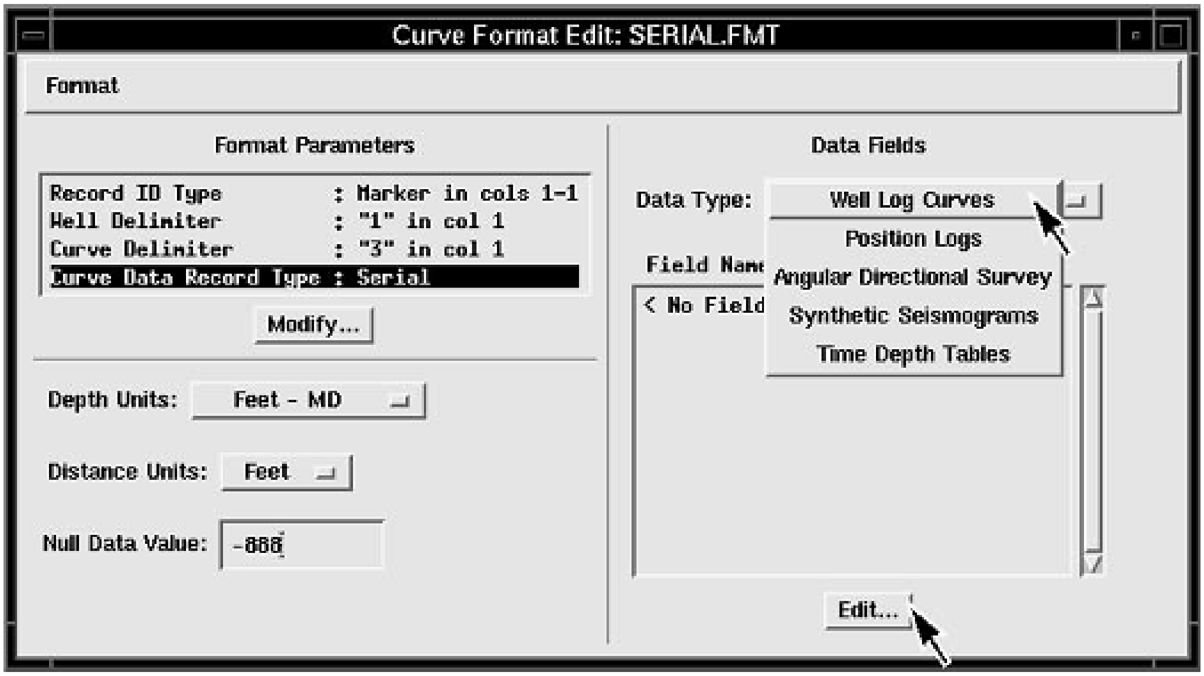
This example uses the data fields shown below.



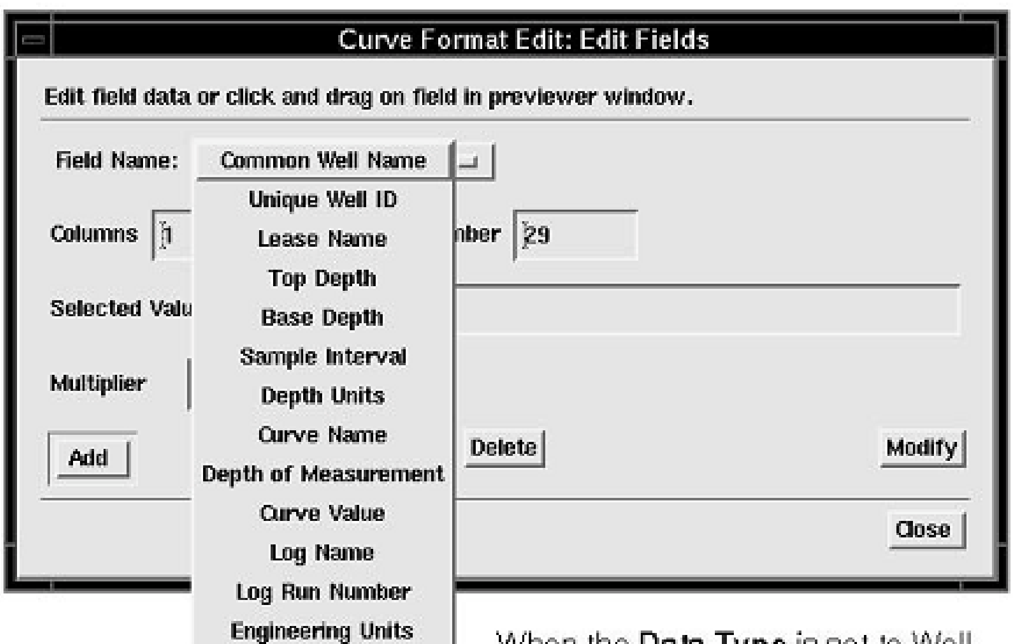
To set the data fields, you again work interactively with the Data Previewer and the Edit Fields window.



To access the Edit Fields window, set the Data Type to Well Log Curves, and click the **Edit** button.



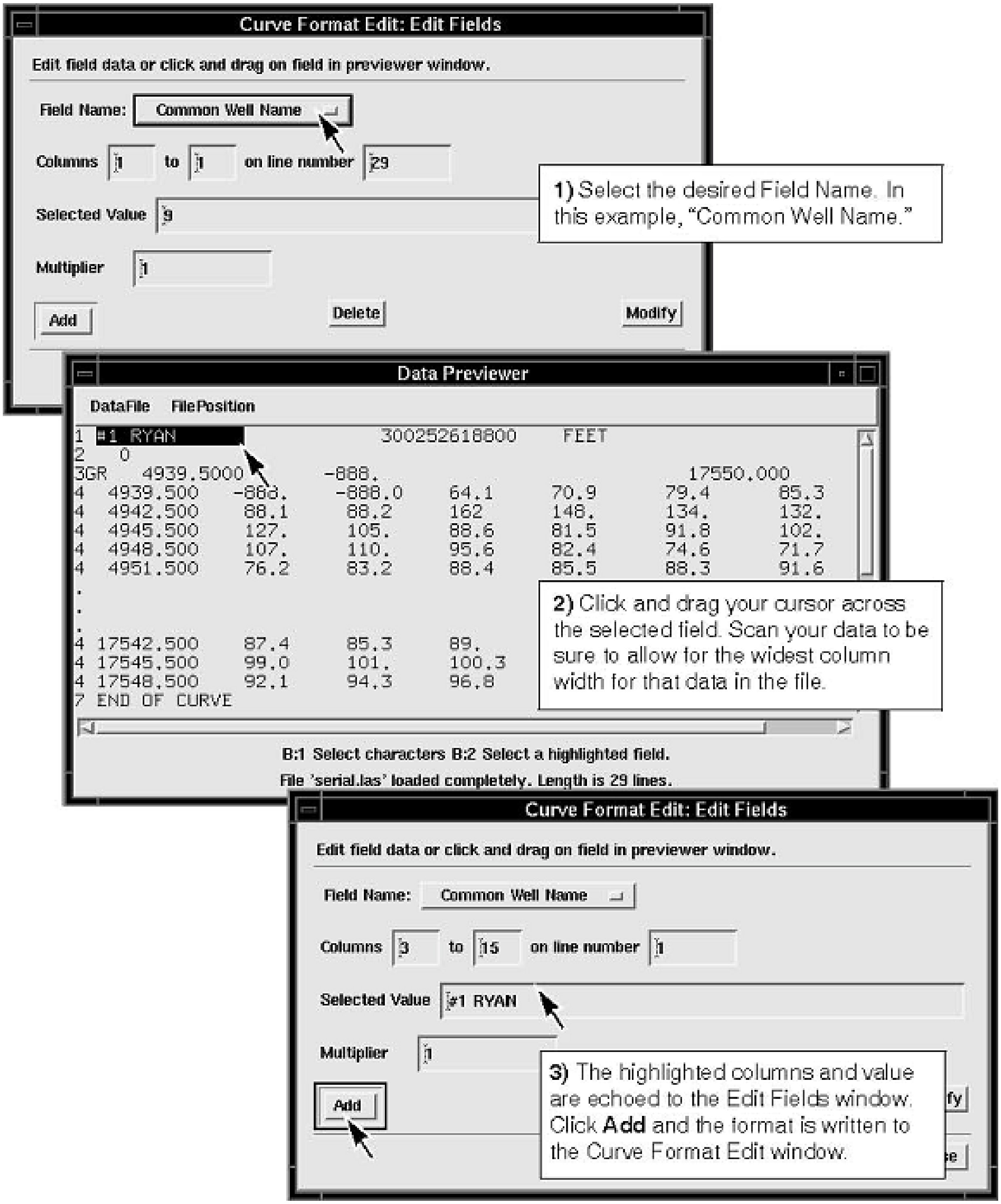
Once Format Parameters are defined, set the Data Type and click **Edit**. The Data Type you select controls which Field Names you are able to describe.



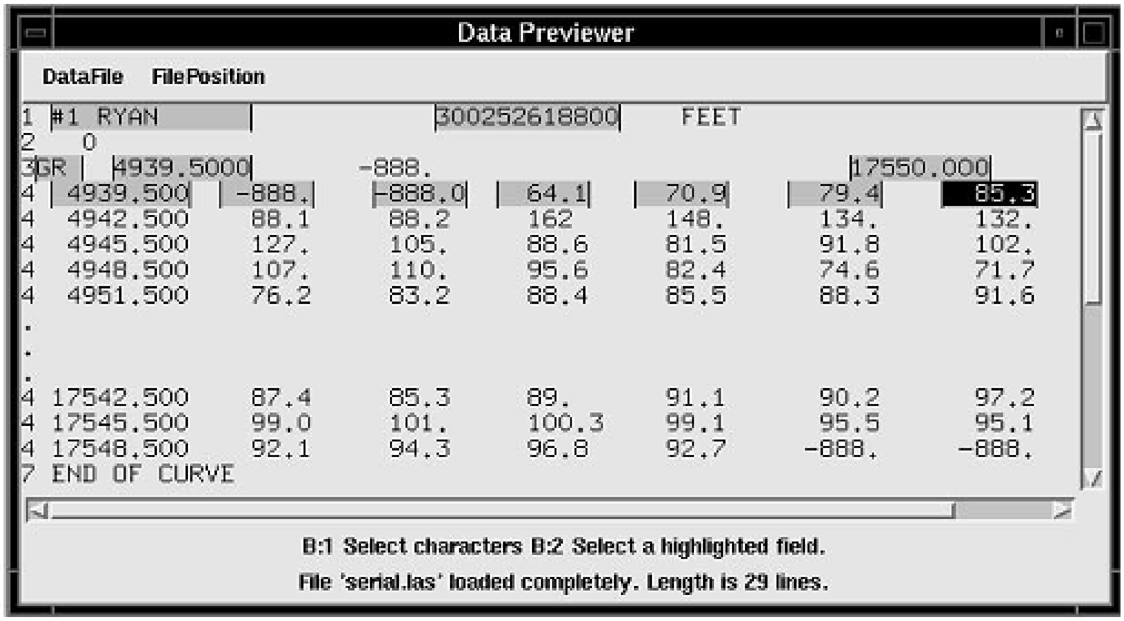
When the **Data Type** is set to Well Log Curves, the Edit Fields window can list only the **Field Names** applicable to Well Log Curve files.

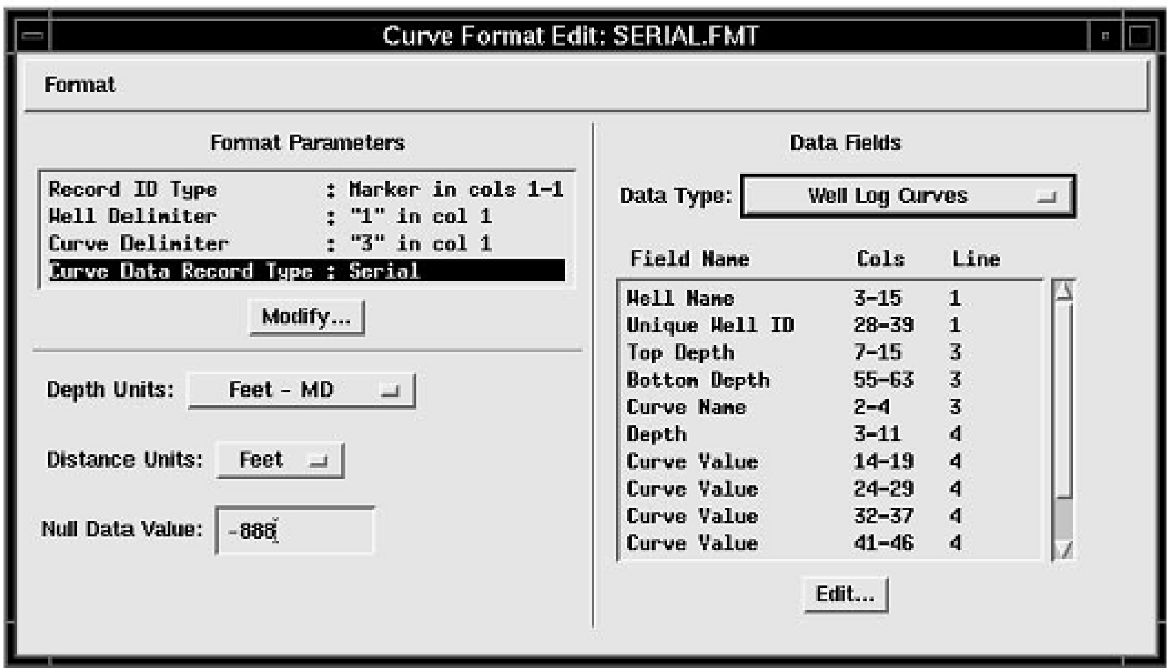
In a similar fashion to loading ASCII well data, you can work between the Edit Fields window and the Data Previewer as follows:

- Select the desired Field Name from the Edit Fields window.
- Click and drag across the selected field in the Data Previewer.
- Click **Add** to write the format to the Curve Format Edit window.



Following the steps shown on the previous page, complete your format by describing the remaining fields.





When the last field is formatted, close the Edit Fields window and save your format by selecting **Format > Save** (Needed) from the Curve Format Edit window. At this point you are ready to scan and load your data.

The procedures for scanning and loading your data are discussed later in this chapter.

Examining Your Format

As mentioned earlier, curve format files are stored in the *owioformats* directory. (Recall that to find where *owioformats* is located, check the `OW_SYSDATA_DIR` variable, usually set in the `$OWHOME/conf/ lgcenv.cf` file.)

The format file created in the previous example is shown below.

UNIX Window

```
;
;----------------------------------------------------------------
;     Copyright (C) 1991,1992 Landmark Graphics Corp.
;     All rights reserved.
;----------------------------------------------------------------
;
FILE FORMAT "SERIAL.FMT" {
      Curve Data Format      : Serial
      Record Format          : Variable "
"
      Well delimiter         : Fixed ("1" 1)
      Curve delimiter        : Fixed ("3" 1)
      Record Identifier      : (col = 1 len = 1)
      NULL VALUE             : -888.000000
      Default Units          : Feet- Feet
      Comments               : "Well Log Curves"
;     Record Formats
;
      RECORD key = "1" {
            FIELD(code=1 col=3 len=13 mult=1.000000)
            FIELD(code=18 col=28 len=12 mult=1.000000)
         }
      RECORD key = "3" {
            FIELD(code=3 col=7 len=9 mult=1.000000)
            FIELD(code=4 col=55 len=9 mult=1.000000)
            FIELD(code=2 col=2 len=3 mult=1.000000)
         }
      RECORD key = "4" {
            FIELD(code=7 col=3 len=9 mult=1.000000)
            FIELD(code=8 col=14 len=6 mult=1.000000)
            FIELD(code=8 col=24 len=6 mult=1.000000)
            FIELD(code=8 col=32 len=6 mult=1.000000)
            FIELD(code=8 col=41 len=6 mult=1.000000)
            FIELD(code=8 col=51 len=6 mult=1.000000)
            FIELD(code=8 col=61 len=6 mult=1.000000)
         }
}
superran:/home/hound3/projects/owioformats>
```

The field codes listed above are defined in the tables at the end of this chapter.

Formatting Multiplexed Data by Count

This example shows a log curve data set that is multiplexed. Since it has no markers, data items must be identified by “count.”

UNIX Window

```
COMP.          COMPANY:   BO-PEG EXPLORATION
WELL.          WELL ID:   #06-05
FLD .            FIELD:   DKMEINEKE
API .       API NUMBER:   031660062592
   Depth        SP         SN          I_D         GR          CAL         RHOB
   2100.000   -72.222      2.022       1.726      76.349      11.675       2.228
   2100.500   -71.729      2.034       1.727      76.746      11.675       2.237
   2101.000   -71.405      2.039       1.727      77.143      11.663       2.242
   2101.500   -71.393      2.039       1.752      77.114      11.635       2.252
   2102.000   -71.371      2.040       1.761      76.746      11.635       2.257
   2102.500   -71.482      2.041       1.775      77.540      11.635       2.255
   2103.000   -72.150      2.042       1.803      76.917      11.635       2.251
   2103.500   -72.139      2.045       1.831      75.118      11.656       2.252
   2104.000   -72.127      2.078       1.860      73.968      11.695       2.260
   2104.500   -72.115      2.111       1.864      73.976      11.736       2.264
   2105.000   -72.103      2.156       1.885      74.365      11.785       2.268
   2105.500   -72.091      2.162       1.900      73.150      11.794       2.274
   2106.000   -72.069      2.198       1.901      70.787      11.794       2.283
   2106.500   -72.178      2.214       1.924      69.603      11.794       2.299
   2107.000   -72.849      2.245       1.938      71.587      11.794       2.320
   2107.500   -72.834      2.293       1.938      71.186      11.794       2.341
   2108.000   -73.609      2.399       2.003      70.000      11.794       2.368
   2108.500   -73.607      2.478       2.074      68.419      11.794       2.402
   2109.000   -73.595      2.645       2.200      66.850      11.794       2.424
   2109.500   -73.576      2.805       2.356      64.095      11.794       2.433
   2110.000   -74.355      3.070       2.588      62.126      11.825       2.428
   2110.500   -74.353      3.386       2.981      60.157      11.837       2.427
```

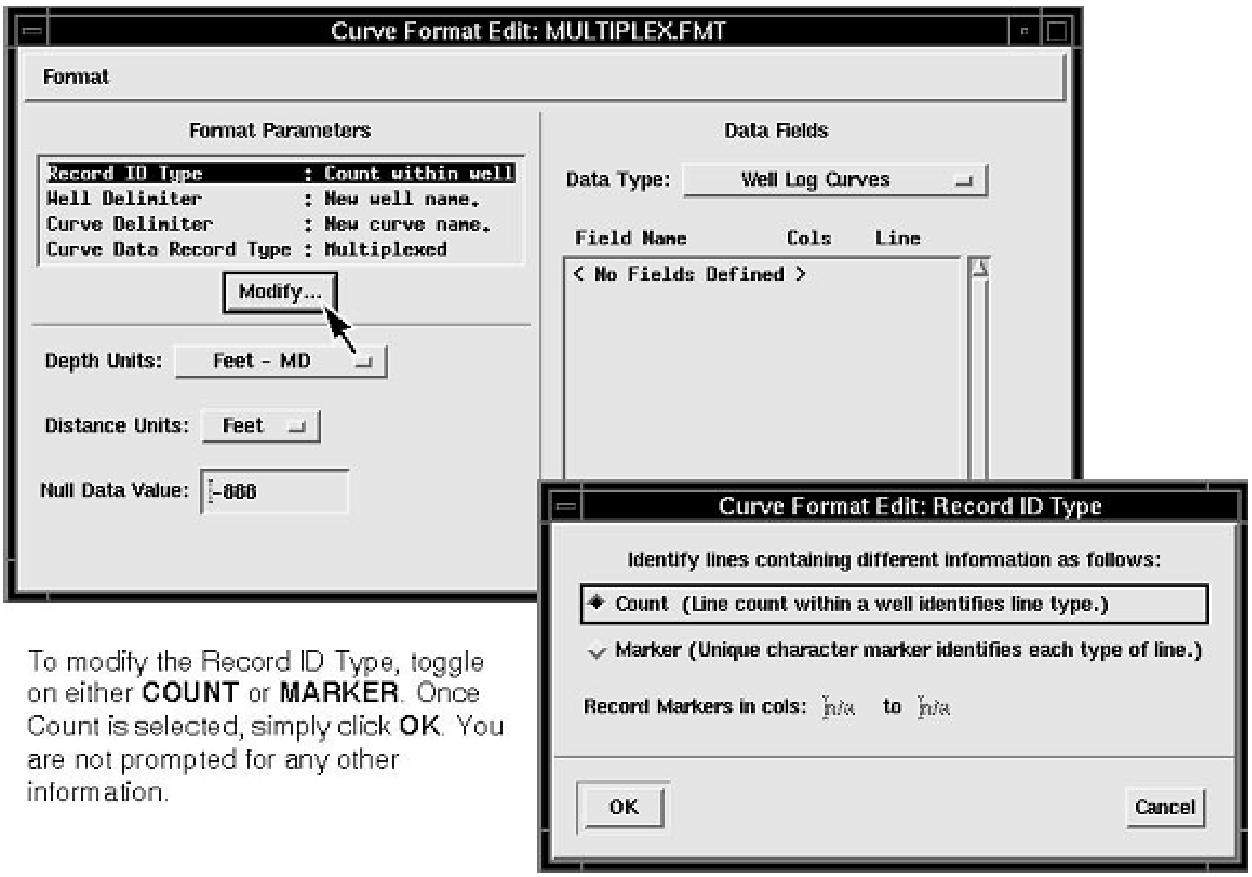
The procedure on the following pages explains how to build and display the format for this file.

Filling Out the Format Parameters

The only difference between building a format file for a data set in which fields are identified by count instead of marker is how the Format Parameters are defined.

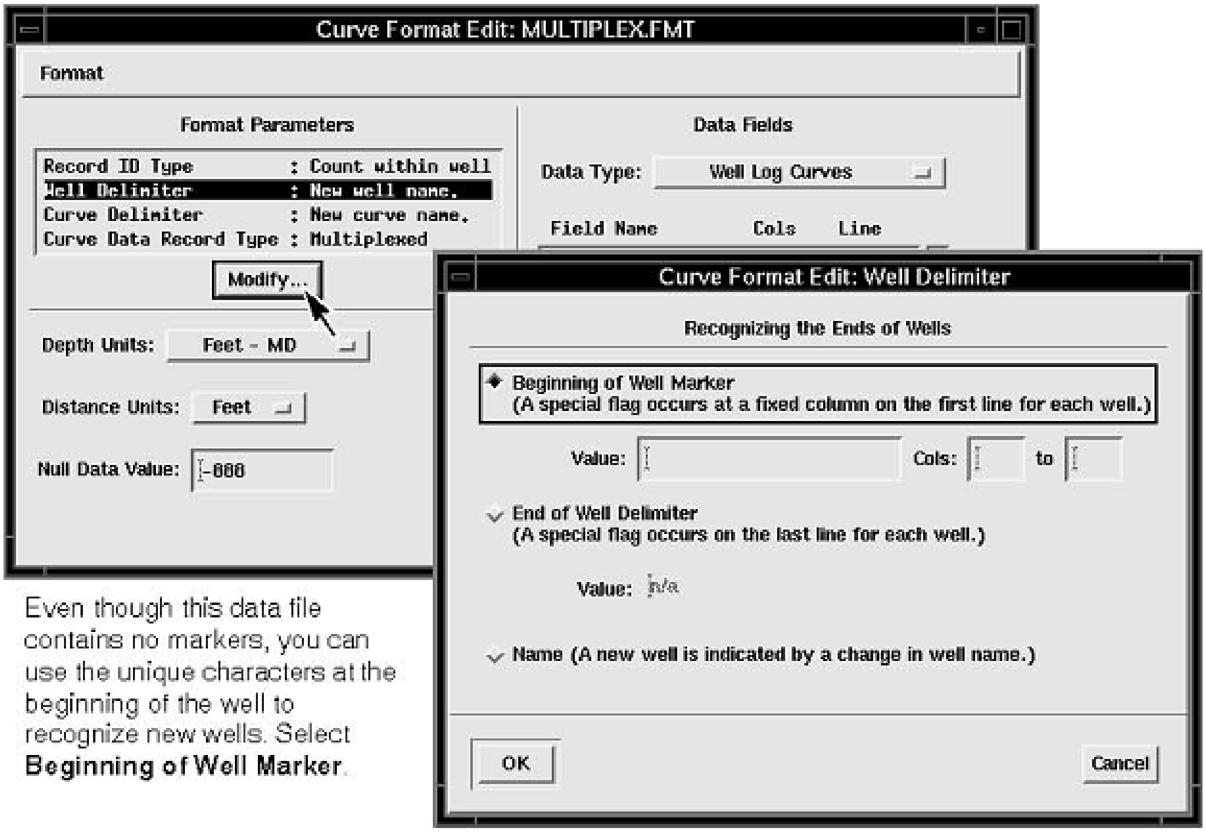
Record ID Type

To set the **Record ID Type**, click on it and press the **Modify** button. The Record ID Type box displays.

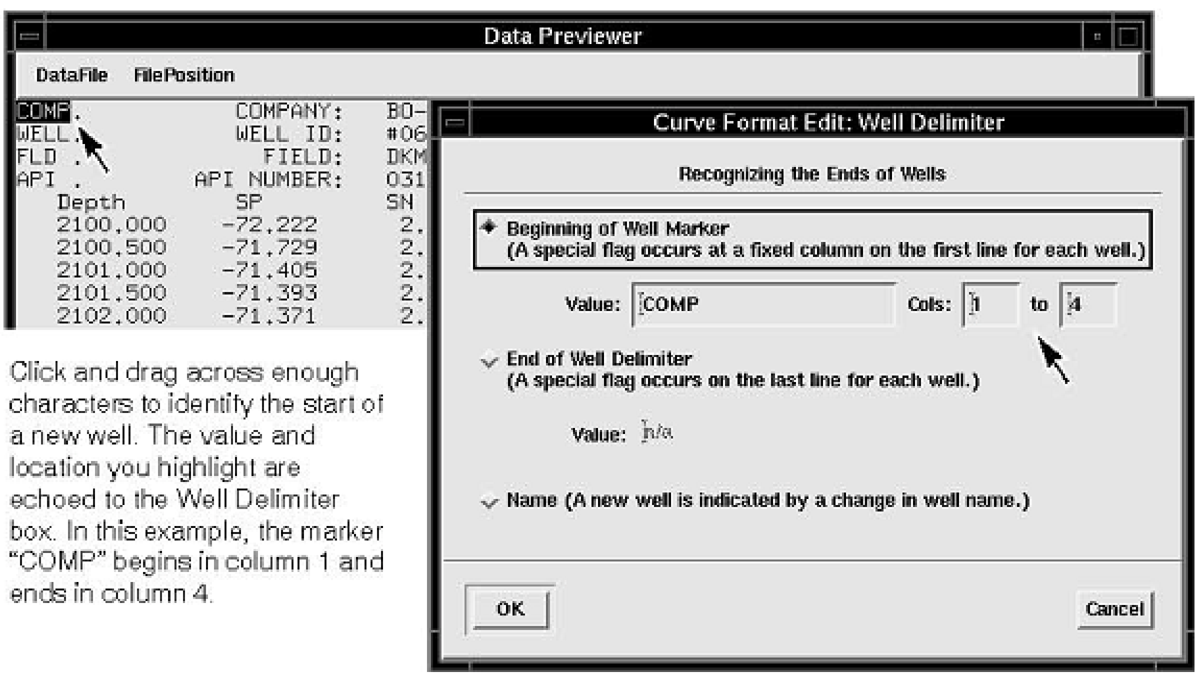


Well Delimiter

To set the **Well Delimiter**, click on it and press the **Modify** button. The Well Delimiter box displays.



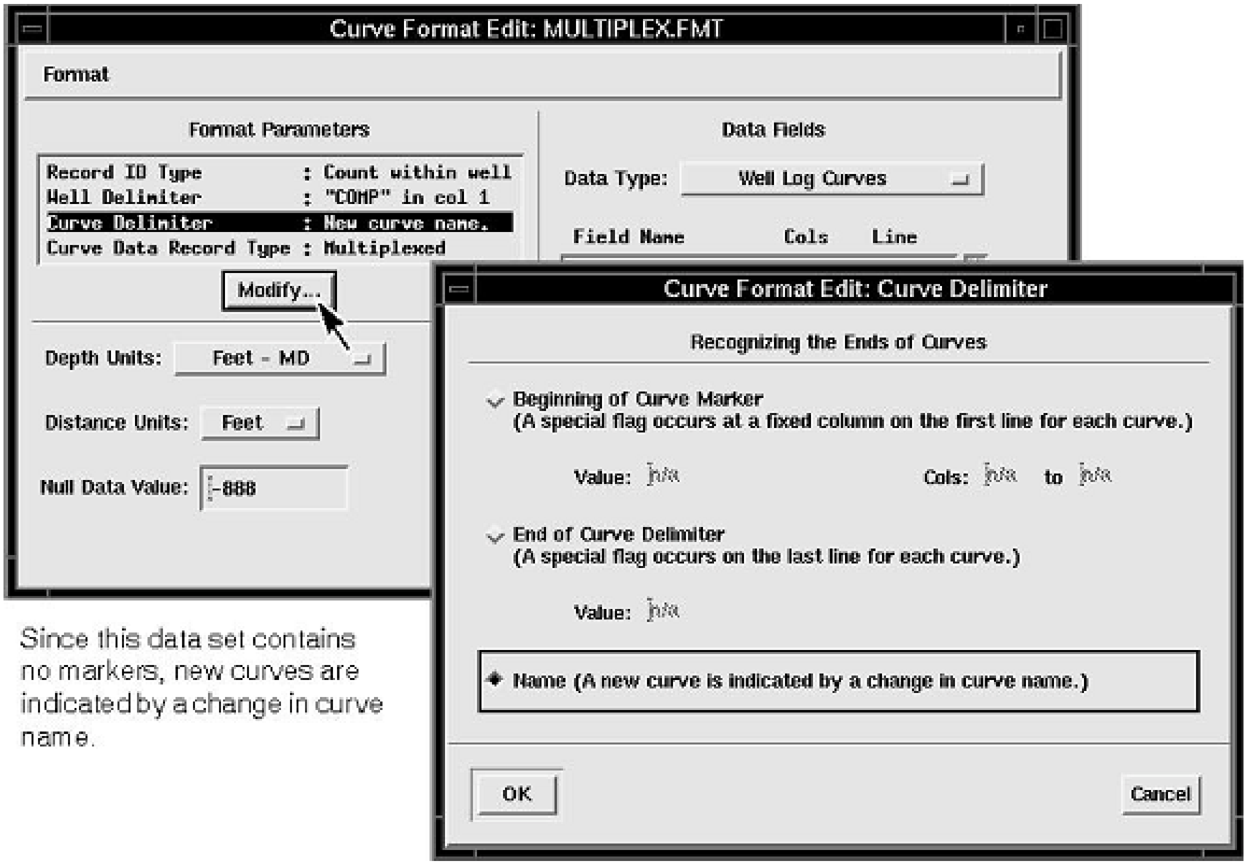
Even though this data file contains no markers, you can use the unique characters at the beginning of the well to recognize new wells. Select **Beginning of Well Marker**.



Click and drag across enough characters to identify the start of a new well. The value and location you highlight are echoed to the Well Delimiter box. In this example, the marker "COMP" begins in column 1 and ends in column 4.

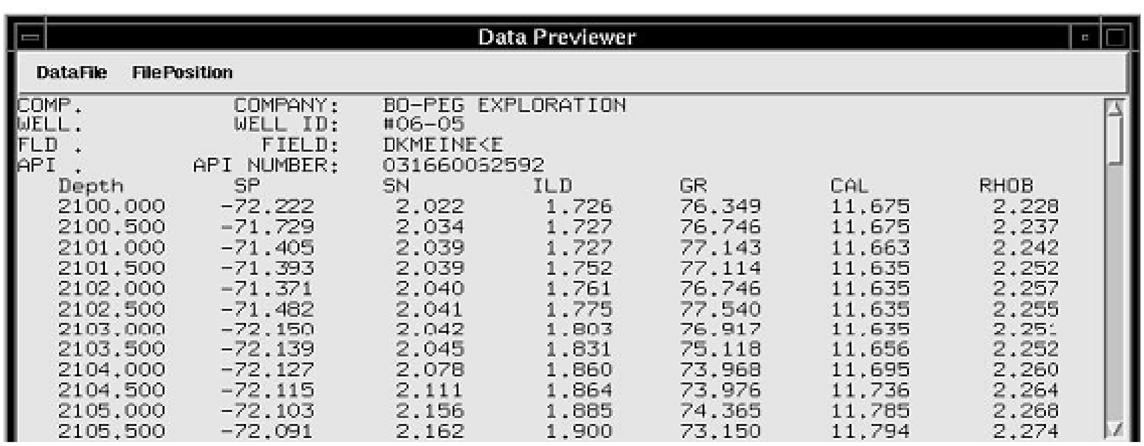
Curve Delimiter

To set the **Curve Delimiter**, click on it and press the **Modify** button. The Curve Delimiter box displays.

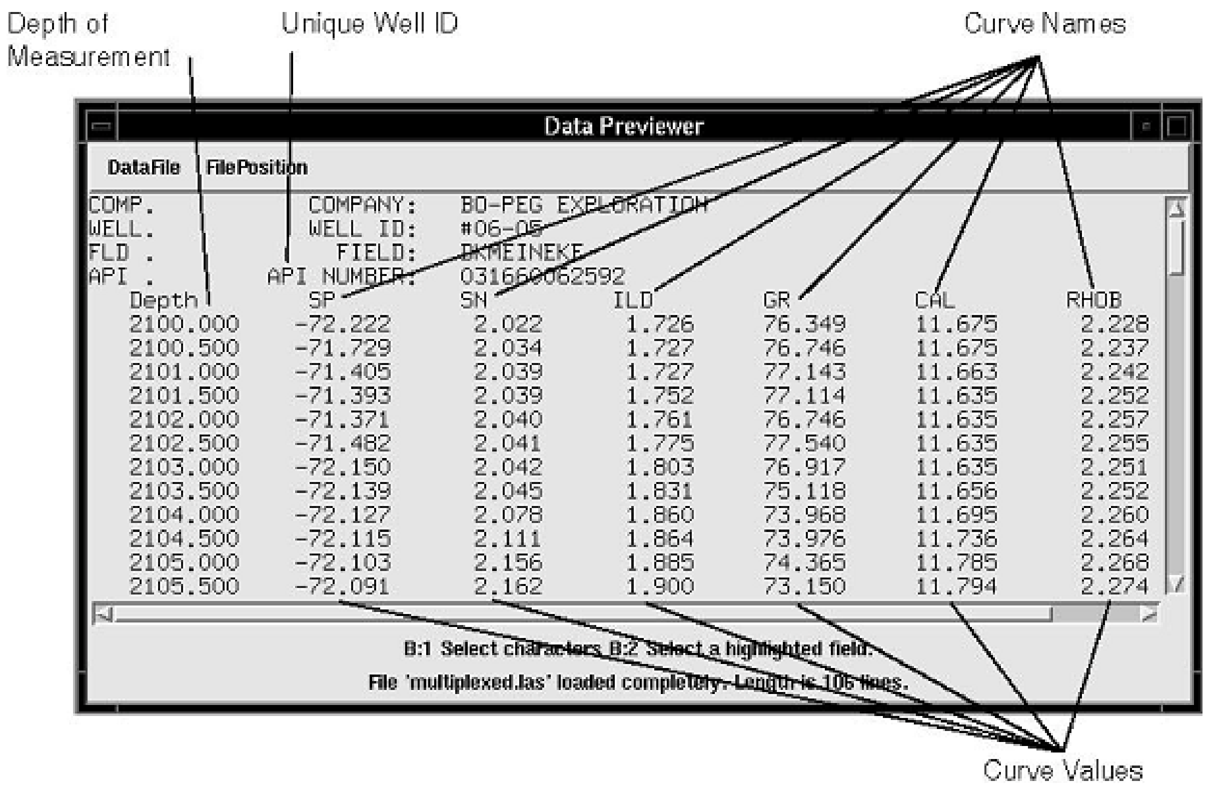


Curve Data Record Type

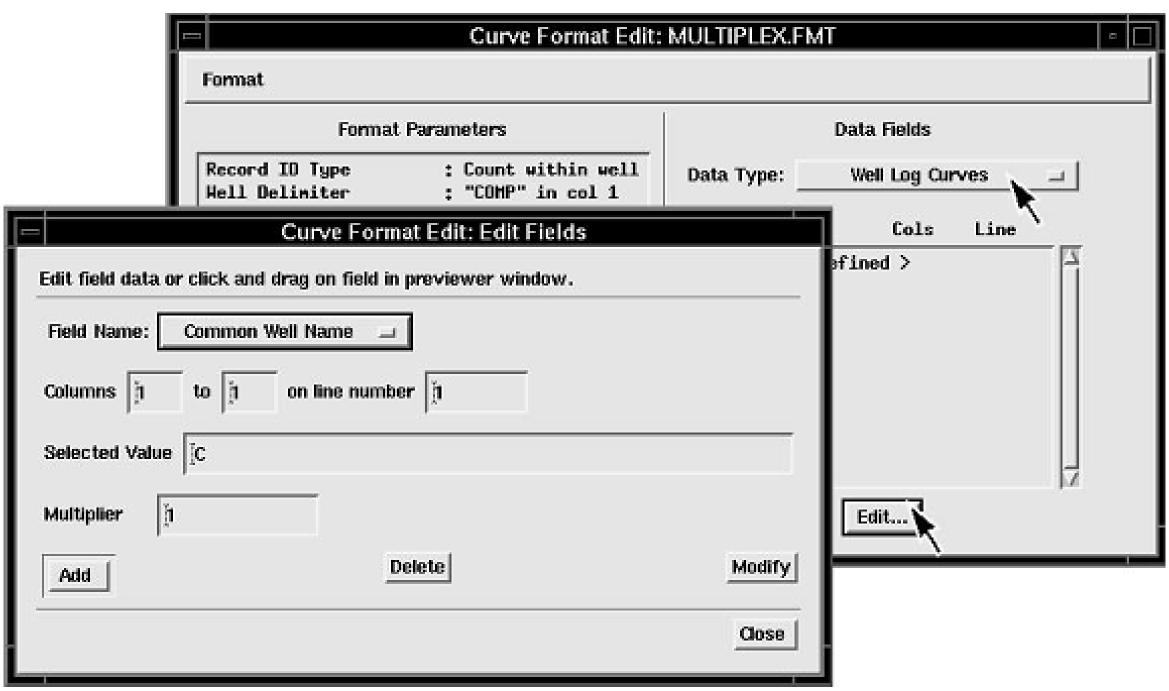
This data is MULTIPLEXED since each record contains values for several different curves.



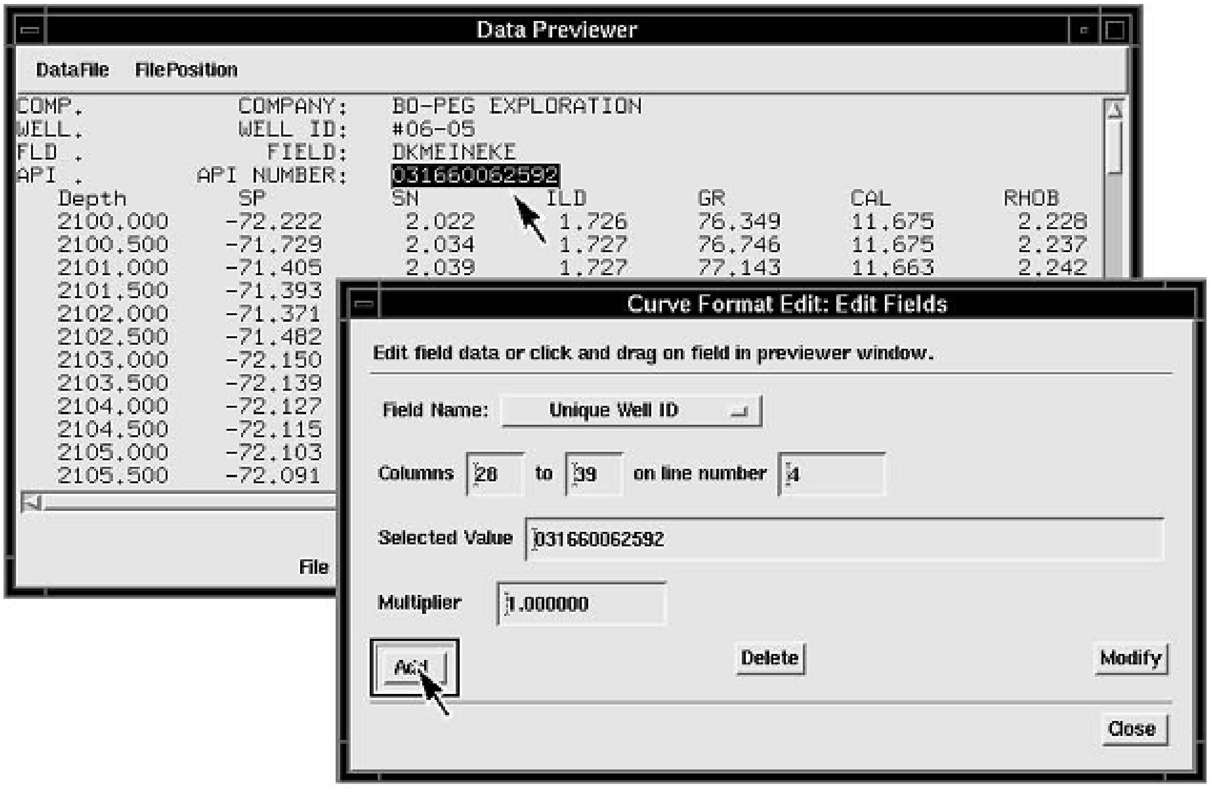
Describing the Data

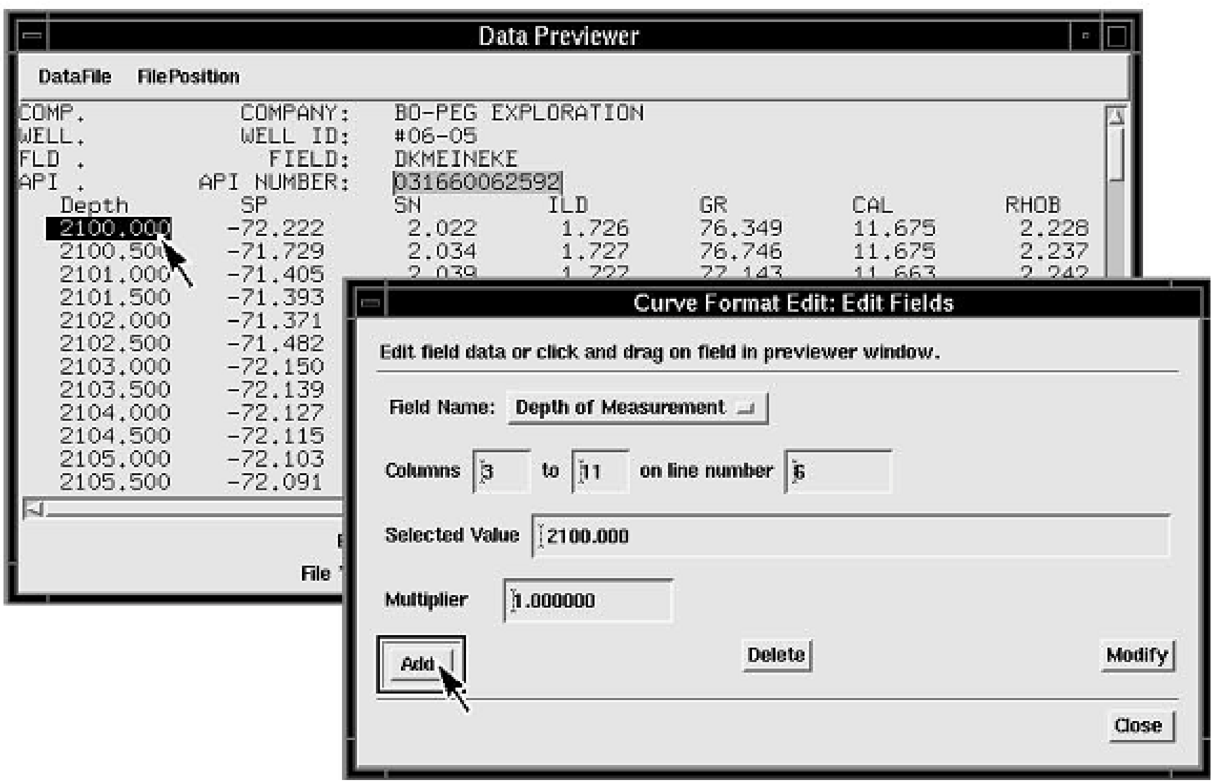


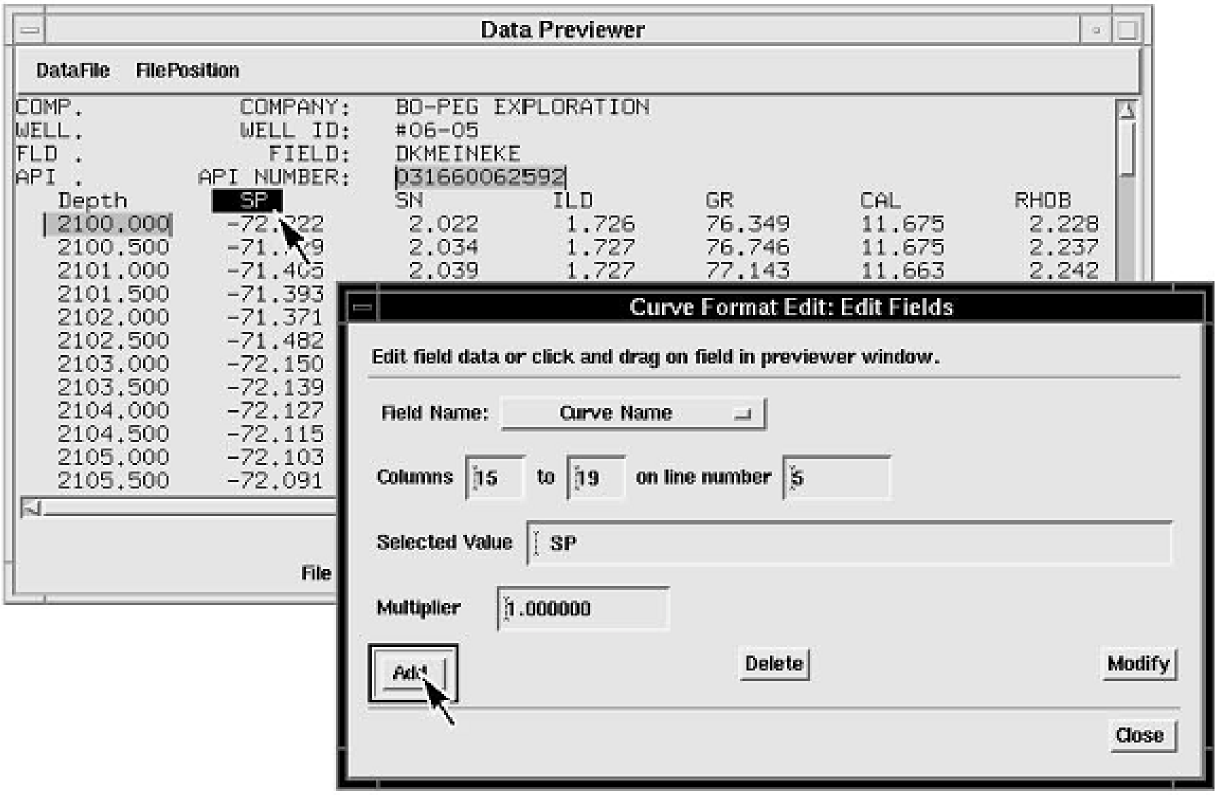
Open the appropriate Edit Fields window by setting the Data Type to **Well Log Curves** and clicking **Edit**.

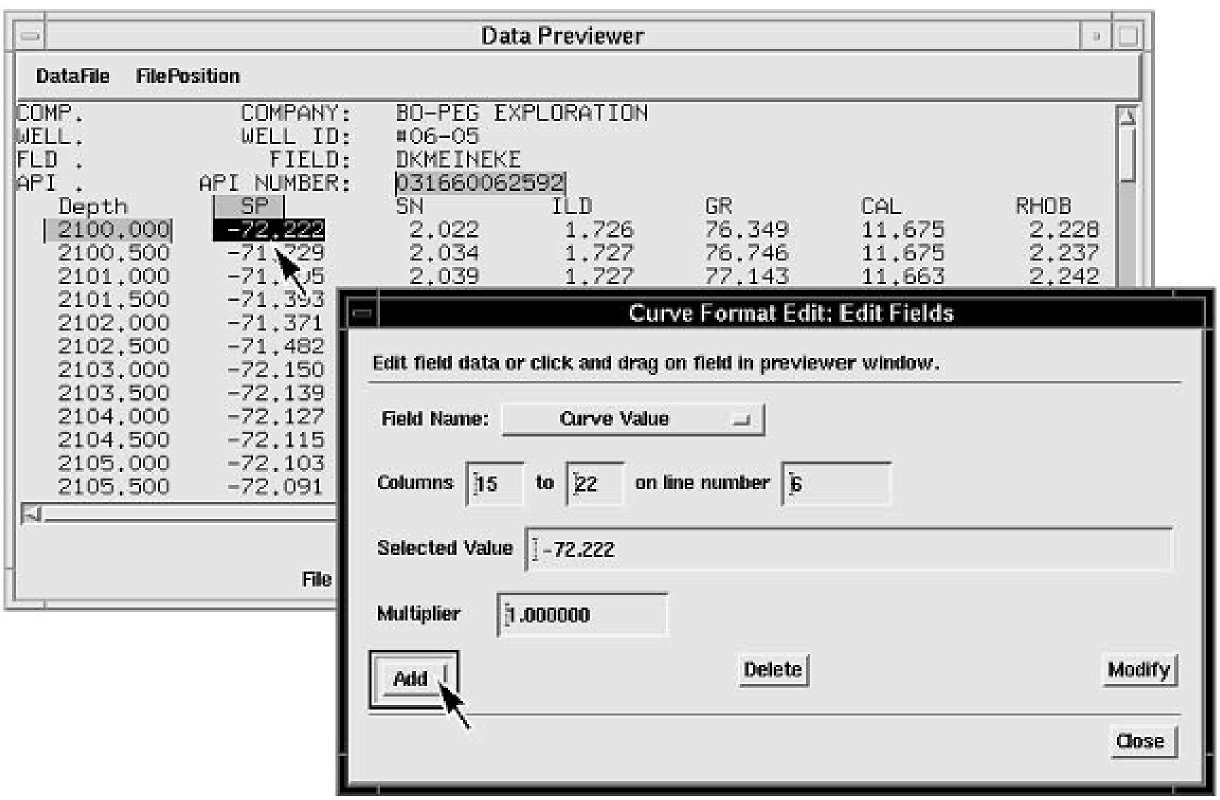


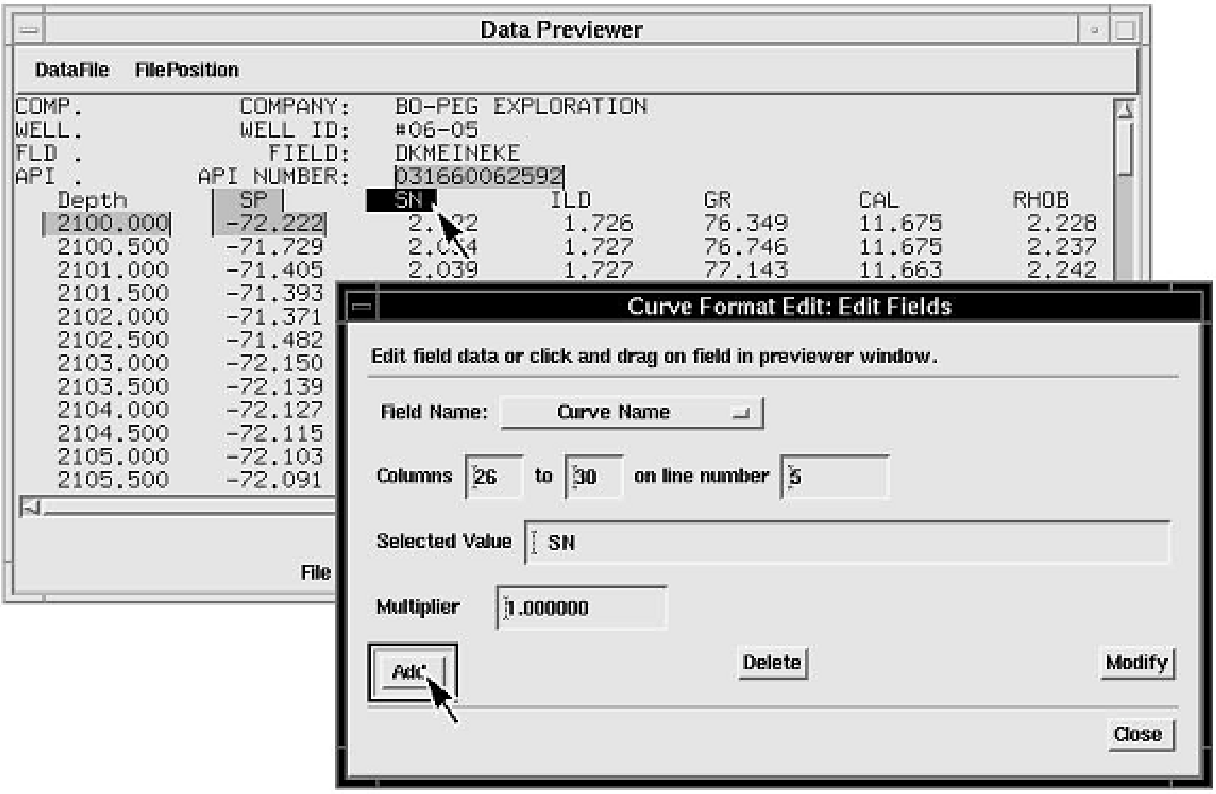
As you did for ASCII well data and serial curve data, work between the Edit Fields window and the Data Previewer to describe your data fields.

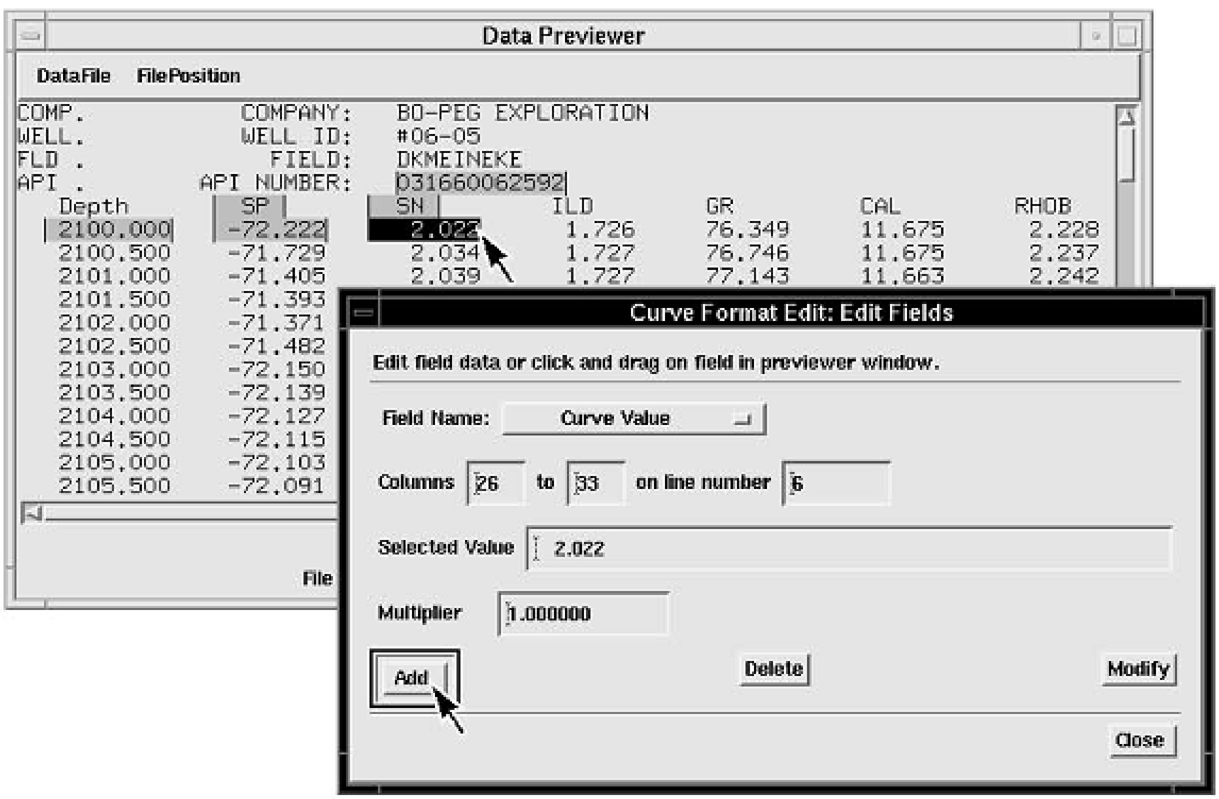


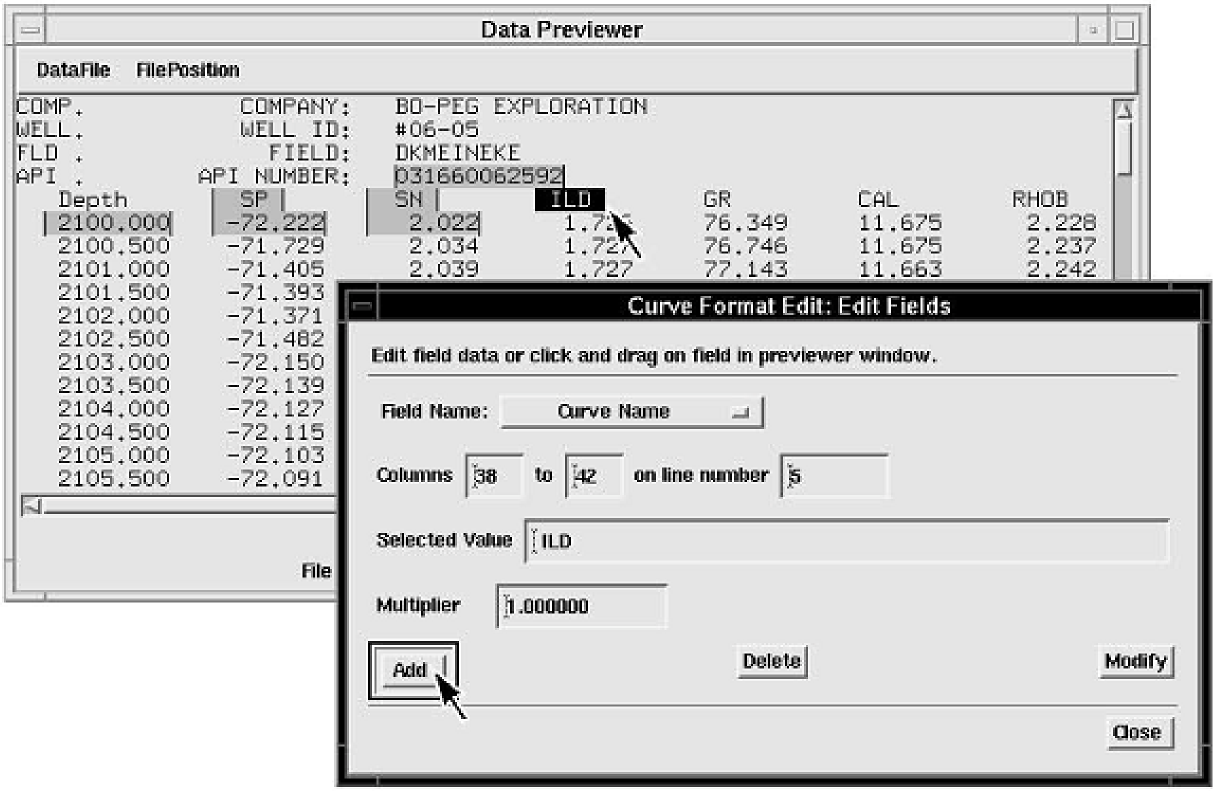


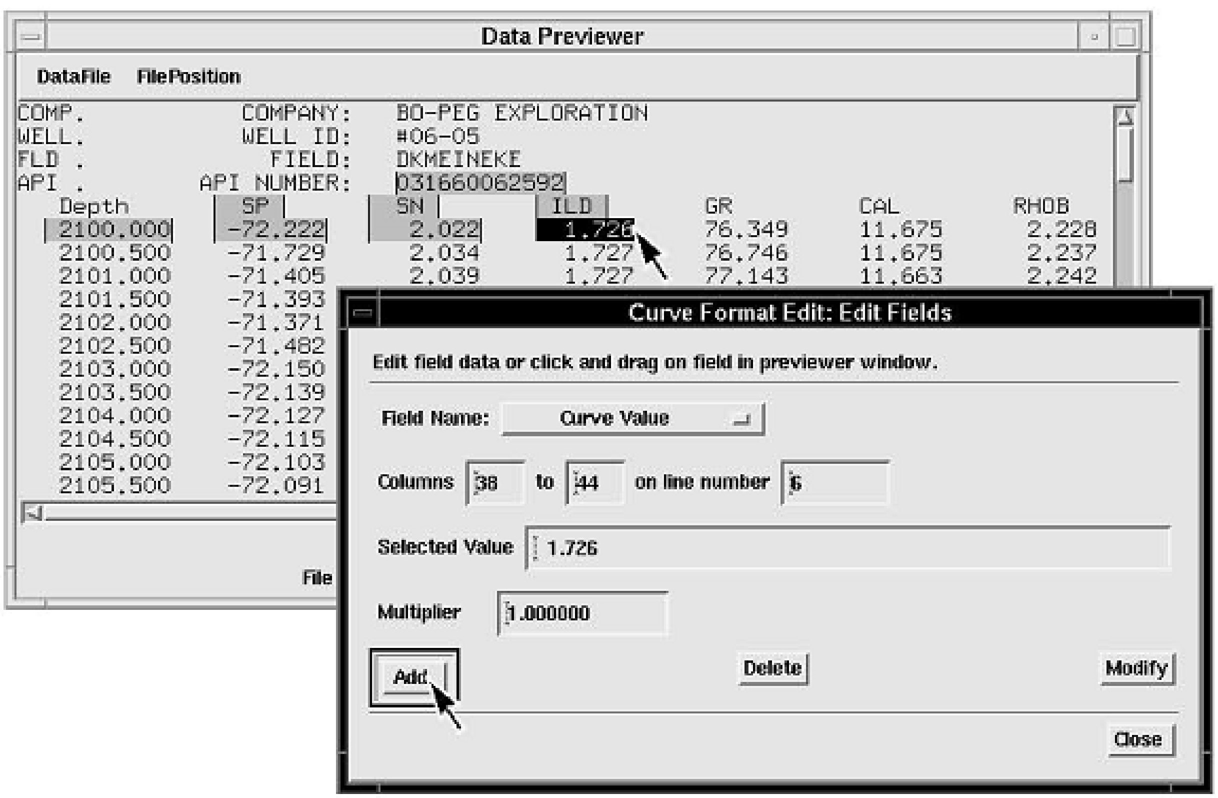

Data Previewer
DataFile
FilePosition
COMP. COMPANY: BO-PEG EXPLORATION
WELL. WELL ID: #06-05
FLD . FIELD: DKMEINEKE
API . API NUMBER: 031660062592
Depth SP SN ILD GR CAL RHOB
2100.000 2.022 1.726 76.349 11.675 2.228
2100.500 2.034 1.727 76.746 11.675 2.237
2101.000 2.039 1.727 77.143 11.663 2.242
2101.500 -71.393
2102.000 -71.371
2102.500 -71.482
2103.000 -72.150
2103.500 -72.139
2104.000 -72.127
2104.500 -72.115
2105.000 -72.103
2105.500 -72.091
File
Curve Format Edit: Edit Fields
Edit field data or click and drag on field in previewer window.
Field Name: Curve Name
Columns 15 to 19 on line number 5
Selected Value SP
Multiplier 1.000000
Delete
Modify
Close


Data Previewer
DataFile
FilePosition
COMP. COMPANY: BO-PEG EXPLORATION
WELL. WELL ID: #06-05
FLD . FIELD: DKMEINEKE
API . API NUMBER: 031660062592
Depth SP SN ILD GR CAL RHOB
2100.000 -72.222 2.022 1.726 76.349 11.675 2.228
2100.500 2.034 1.727 76.746 11.675 2.237
2101.000 2.039 1.727 77.143 11.663 2.242
2102.000 -71.371
2102.500 -71.482
2103.000 -72.150
2103.500 -72.139
2104.000 -72.127
2104.500 -72.115
2105.000 -72.103
2105.500 -72.091
File
Curve Format Edit: Edit Fields
Edit field data or click and drag on field in previewer window.
Field Name: Curve Value
Columns 15 to 22 on line number 6
Selected Value -72.222
Multiplier 1.000000
Add
Delete
Modify
Close

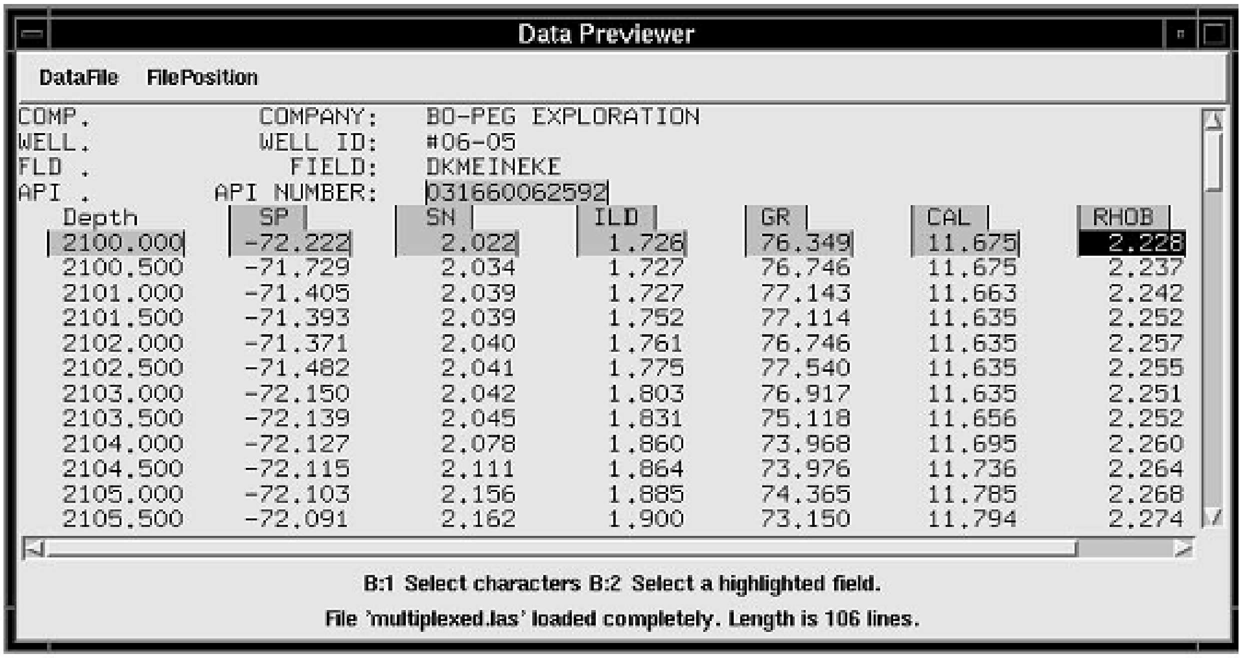

Data Previewer
DataFile
FilePosition
COMP. COMPANY: BO-PEG EXPLORATION
WELL. WELL ID: #06-05
FLD . FIELD: DKMEINEKE
API . API NUMBER: 031660062592
Depth SP SN ILD GR CAL RHOB
2100.000 -72.222 1.726 76.349 11.675 2.228
2100.500 -71.729 1.727 76.746 11.675 2.237
2101.000 -71.405 2.039 1.727 77.143 11.663 2.242
2101.500 -71.393
2102.000 -71.371
2102.500 -71.482
2103.000 -72.150
2103.500 -72.139
2104.000 -72.127
2104.500 -72.115
2105.000 -72.103
2105.500 -72.091
File
Curve Format Edit: Edit Fields
Edit field data or click and drag on field in previewer window.
Field Name: Curve Name
Columns 26 to 30 on line number 5
Selected Value SN
Multiplier 1.000000
Delete
Modify
Close

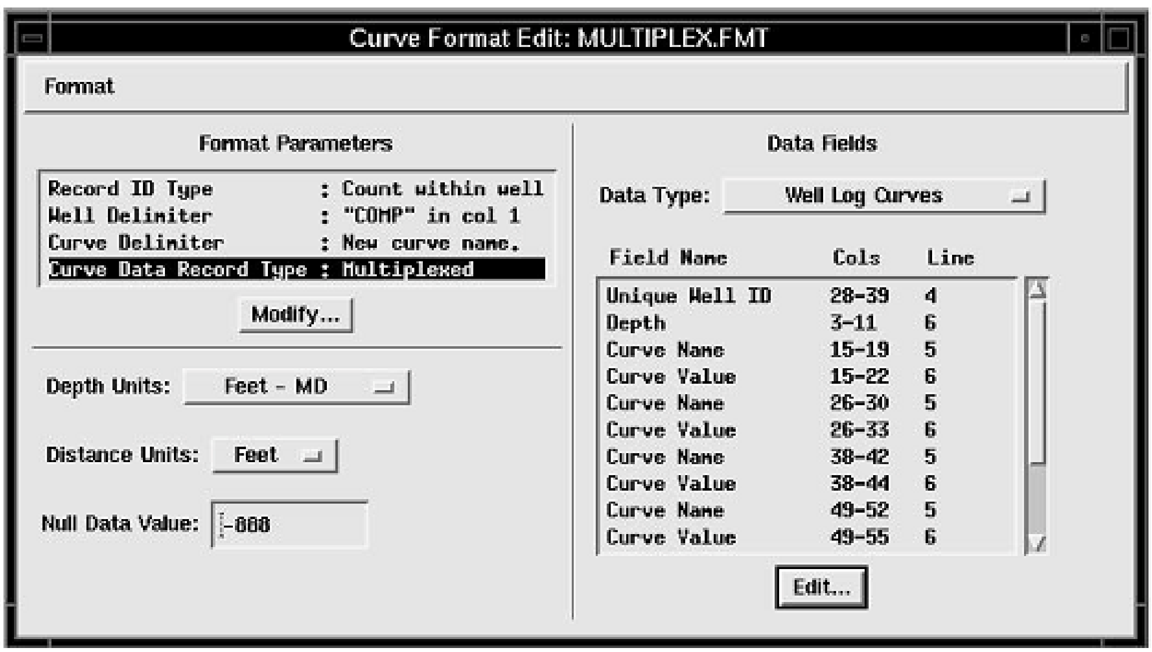

Data Previewer
DataFile
FilePosition
COMP. COMPANY: BO-PEG EXPLORATION
WELL. WELL ID: #06-05
FLD . FIELD: DKMEINEKE
API . API NUMBER: 031660062592
Depth SP SN ILD GR CAL RHOB
2100.000 -72.222 2.022 1.726 76.349 11.675 2.228
2100.500 -71.729 2.034 1.727 76.746 11.675 2.237
2101.000 -71.405 2.039 1.727 77.143 11.663 2.242
2101.500 -71.393
2102.000 -71.371
2102.500 -71.482
2103.000 -72.150
2103.500 -72.139
2104.000 -72.127
2104.500 -72.115
2105.000 -72.103
2105.500 -72.091
File
Curve Format Edit: Edit Fields
Edit field data or click and drag on field in previewer window.
Field Name: Curve Value
Columns 26 to 33 on line number 6
Selected Value 2.022
Multiplier 1.000000
Add
Delete
Modify
Close


Data Previewer
DataFile
FilePosition
COMP. COMPANY: BO-PEG EXPLORATION
WELL. WELL ID: #06-05
FLD . FIELD: DKMEINEKE
API . API NUMBER: 031660062592
Depth SP SN ILD GR CAL RHOB
2100.000 -72.222 2.022 76.349 11.675 2.228
2100.500 -71.729 2.034 1.727 76.746 11.675 2.237
2101.000 -71.405 2.039 1.727 77.143 11.663 2.242
2101.500 -71.393
2102.000 -71.371
2102.500 -71.482
2103.000 -72.150
2103.500 -72.139
2104.000 -72.127
2104.500 -72.115
2105.000 -72.103
2105.500 -72.091
File
Curve Format Edit: Edit Fields
Edit field data or click and drag on field in previewer window.
Field Name: Curve Name
Columns 38 to 42 on line number 5
Selected Value ILD
Multiplier 1.000000
Add
Delete
Modify
Close


Data Previewer
DataFile
FilePosition
COMP. COMPANY: BO-PEG EXPLORATION
WELL. WELL ID: #06-05
FLD . FIELD: DKMEINEKE
API . API NUMBER: 031660062592
Depth SP SN ILD GR CAL RHOB
2100.000 -72.222 2.022 1.726 76.349 11.675 2.228
2100.500 -71.729 2.034 1.727 76.746 11.675 2.237
2101.000 -71.405 2.039 1.727 77.143 11.663 2.242
2101.500 -71.393
2102.000 -71.371
2102.500 -71.482
2103.000 -72.150
2103.500 -72.139
2104.000 -72.127
2104.500 -72.115
2105.000 -72.103
2105.500 -72.091
File
Curve Format Edit: Edit Fields
Edit field data or click and drag on field in previewer window.
Field Name: Curve Value
Columns 38 to 44 on line number 6
Selected Value 1.726
Multiplier 1.000000
Add
Delete
Modify
Close

Your completed format should look like this.





When the last field is formatted, close the Edit Fields window and save your format by selecting **Format > Save (Needed)** from the Curve Format Edit window. At this point you are ready to scan and load your data.

The procedures for scanning and loading your data are discussed in the next section.

Examining Your Format

The format file created in the previous example is shown here.

UNIX Window

```
;-------------------------------------------------------------------------
;    Copyright (C) 1991,1992 Landmark Graphics Corp.
;    All rights reserved.
;-------------------------------------------------------------------------
;
FILE FORMAT "MULTIPLEX.FMT" {
     Curve Data Format      : Multiplexed
     Record Format          : Variable "
"
     Well delimiter         : Fixed ("COMP" 1)
     Curve delimiter        : Name
     Record Identifier      : Count
     NULL VALUE             : -888.000000
     Default Units          : Feet- Feet
     Comments               : "Well Log Curves"
;    Record Formats
;
     RECORD (min=4 max=4) {
           FIELD(code=18 col=28 len=12 mult=1.000000)
        }
     RECORD (min=5 max=5) {
           FIELD(code=2 col=15 len=5 mult=1.000000)
           FIELD(code=2 col=26 len=5 mult=1.000000)
           FIELD(code=2 col=38 len=5 mult=1.000000)
           FIELD(code=2 col=49 len=4 mult=1.000000)
           FIELD(code=2 col=60 len=5 mult=1.000000)
           FIELD(code=2 col=71 len=6 mult=1.000000)
        }
     RECORD (min=6 max=10000000) {
           FIELD(code=7 col=3 len=9 mult=1.000000)
           FIELD(code=8 col=15 len=8 mult=1.000000)
           FIELD(code=8 col=26 len=8 mult=1.000000)
           FIELD(code=8 col=38 len=7 mult=1.000000)
           FIELD(code=8 col=49 len=7 mult=1.000000)
           FIELD(code=8 col=60 len=7 mult=1.000000)
           FIELD(code=8 col=71 len=7 mult=1.000000)
        }
}
```

The field codes listed above are defined in the tables at the end of this chapter.

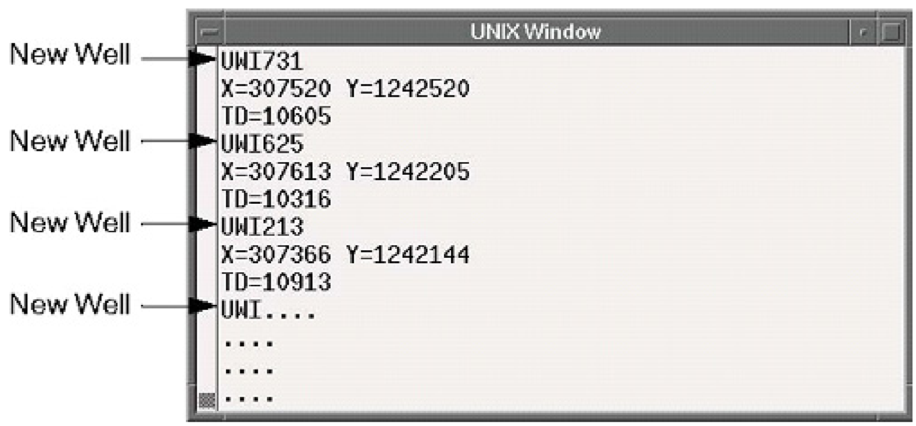
Do Not Confuse "Count" and "Number of Lines per Record"

Be careful not to confuse loading well data that has a constant number of lines per record with curve data that is loaded by count. Count refers to the curve header and not the actual curve data.

Wells by "Lines Per Record"

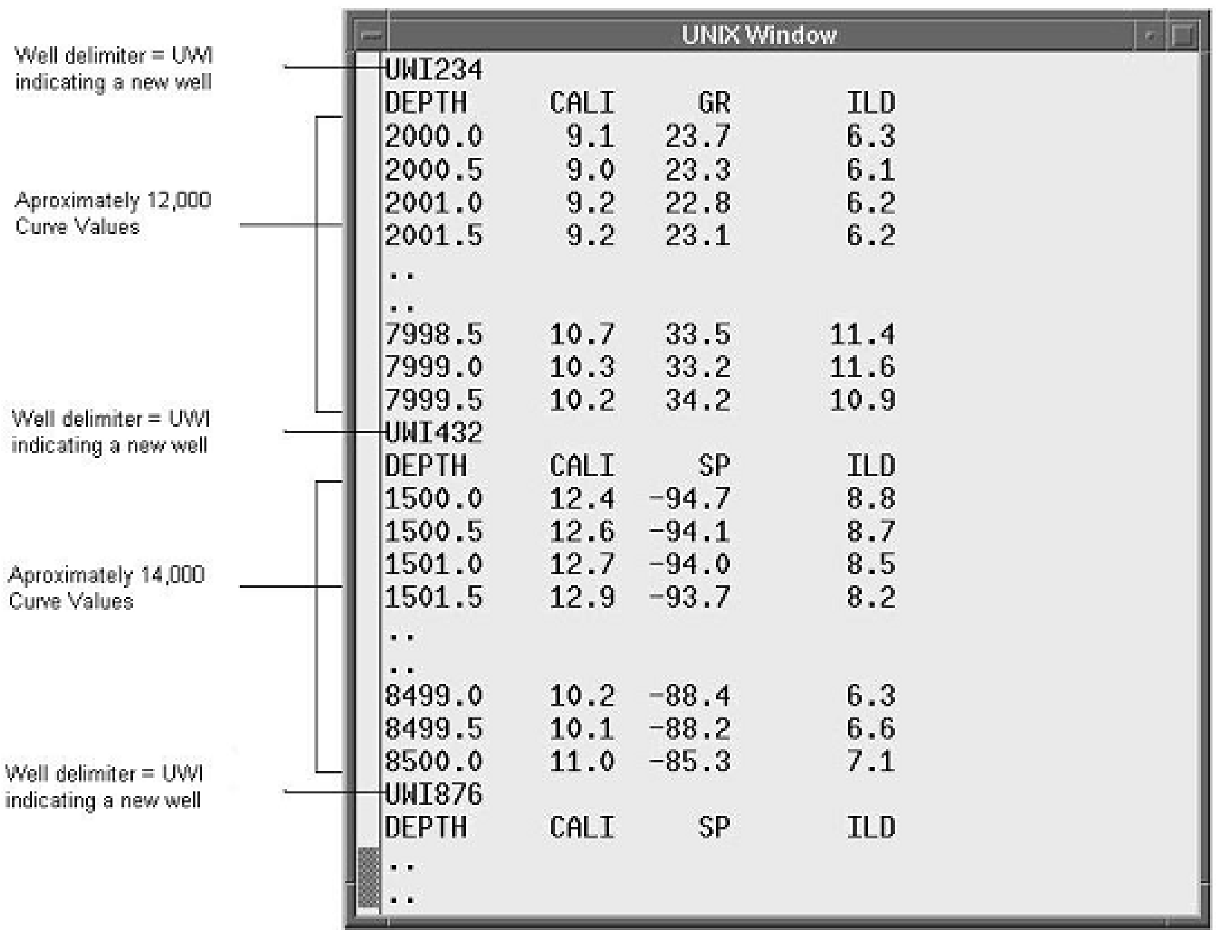
Recall that well data can be in a format where each well occurs on a set number of lines.

Lines Per Record indicates a specific number of lines for each well. The number of Lines Per Record is the same for each well. For example, if well data is organized onto three lines per well, the first line might contain the UWI, the second line might contain the location, and the third line might contain the total depth. The fourth line of the file will contain the UWI of the next well, followed by lines for location and total depth. UWIs of subsequent wells will display on lines 7, 10, 13, 16, and so on, every three lines, as shown below.



Curves by “Count”

When loading curve data by count, there is not a constant number of lines per well, as each well will have a varying number of curve values. Count restarts at one with each new well. In curve loading, the Well Delimiter lets you recognize where a new well begins or ends. “Count” indicates that the first line of a new well may contain the UWI, the second line may contain the curve names, and the third line may contain the beginning of the depth measurements and curve values. Count is reset to one when the next Well Delimiter is encountered, as shown below.



Scanning and Loading ASCII Curve Data

The Curve Loader allows you to choose one of two methods for loading ASCII data:

- Load all the data from the input file.
- Load selected data from a scan report.

You might choose *Load All* for the following reasons:

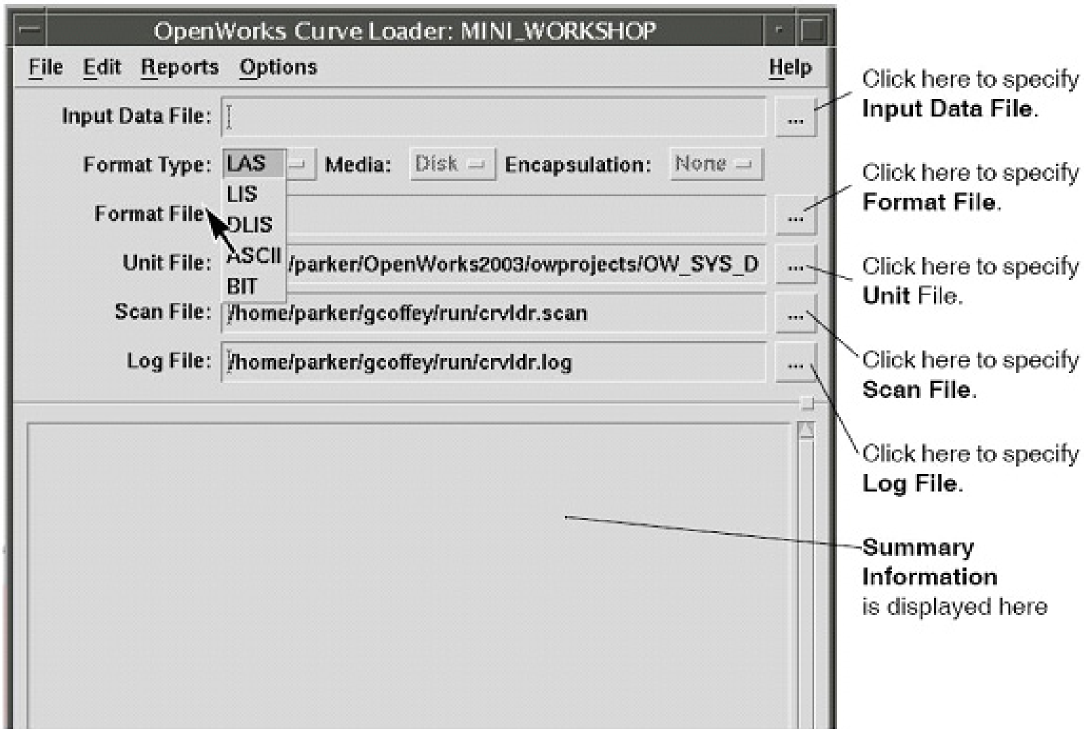
- You want to load data the fastest way.
- The curve and well names in your input file match the names in your project exactly.
- You have large amounts of data.
- You want to resolve naming discrepancies between the input file and the project database automatically. (You have the choice of ignoring them or adding well instances and curve names to the project.)

You might choose *Load Select* for the following reasons:

- You want to load only selected curves from a scan report.
- You want to handle discrepancies individually.

Selecting the Input Data and Format Type

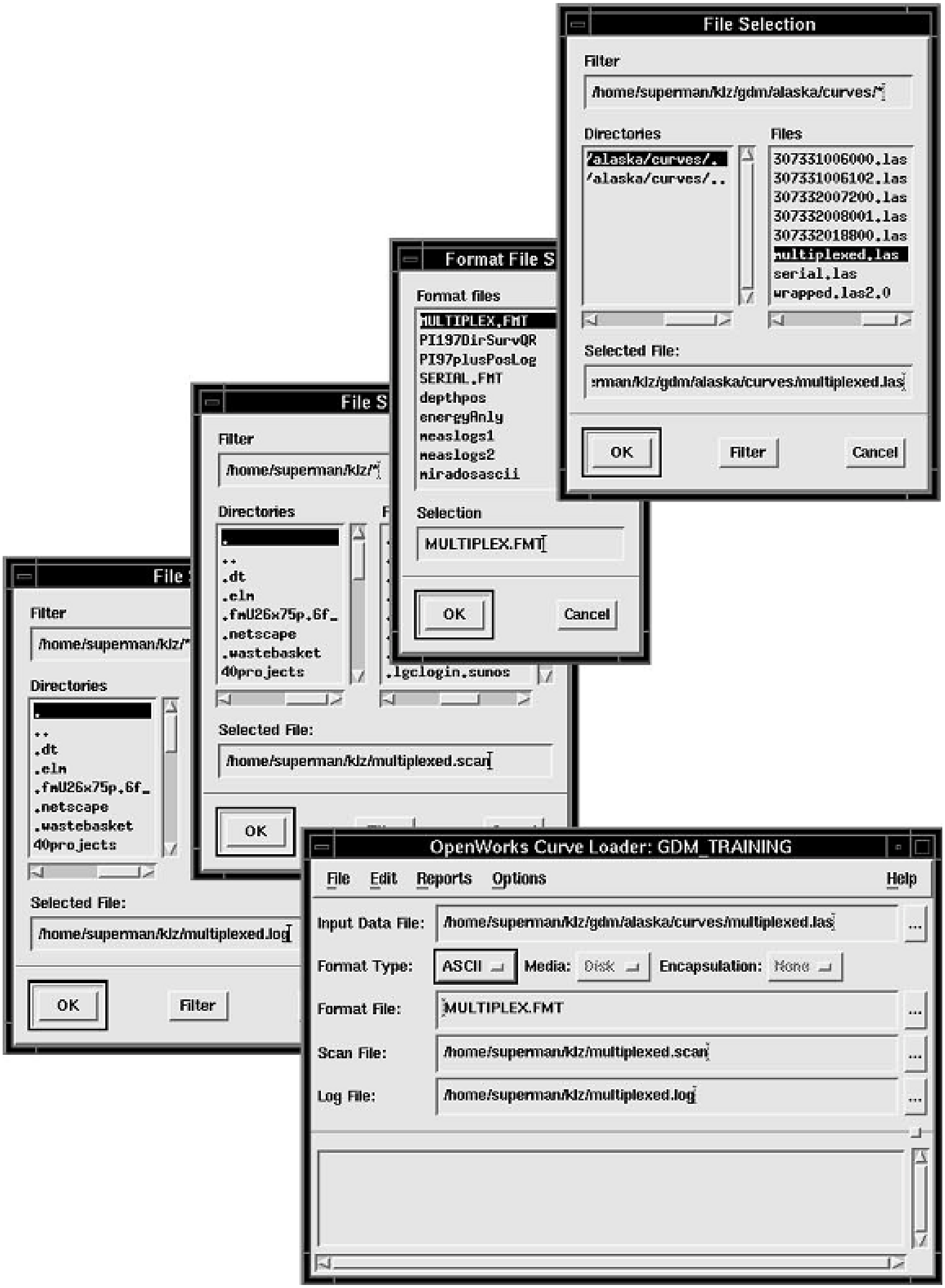
Once your format is built, the next step in loading your data is to specify the input files and format type. These are briefly discussed below.



- **Input Data File** - this is the data file you want to load.
- **Format Type** - set this to either ASCII or LAS.

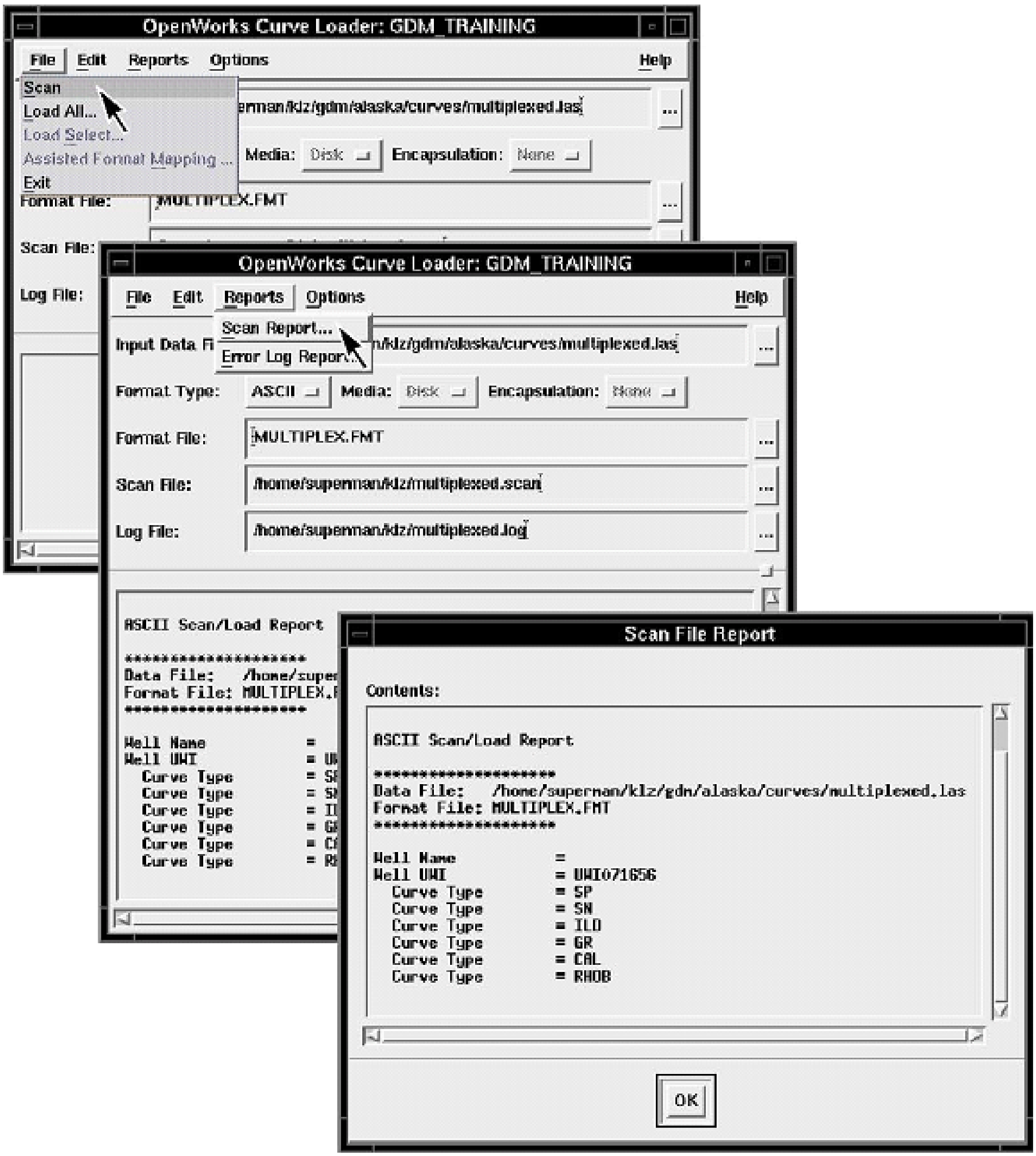
> **For ASCII Data, Set Format Type to ASCII or LAS**
>
> The ASCII option requires you to select a Format File, as in the previous examples. The LAS option does not require a Format File, as it assumes the data is in the Log ASCII Standard designed by the Canadian Well Logging Society for log data on floppy disks. LIS, DLIS, and BIT are binary formats. They are discussed in Chapter 7.

- **Format File** - this is the description of your input data file.
- **Unit File** - assigns units of measurement to the input data.
- **Scan File** - contains information generated during a scan.
- **Log File** - contains messages generated during data loading.


File Selection
Filter
/home/superman/klz/gdm/alaska/curves/*
Directories
/alaska/curves/.
/alaska/curves/..
Files
307331006000.las
307331006102.las
307332007200.las
307332008001.las
307332018800.las
multiplexed.las
serial.las
wrapped.las2.0
Selected File:
rman/klz/gdm/alaska/curves/multiplexed.las
OK
Filter
Cancel
Format File S
Format files
MULTIPLEX.FMT
PI197DirSurvQR
PI97plusPosLog
SERIAL.FMT
depthpos
energyAnly
measlogs1
measlogs2
miradosascii
Selection
MULTIPLEX.FMT
OK
Cancel
File S
Filter
/home/superman/klz/*
Directories
.
..
.dt
.elm
.fmU26x75p.6f_
.netscape
.wastebasket
40projects
.lgclogin.sunos
Selected File:
/home/superman/klz/multiplexed.scan
OK
File
Filter
/home/superman/klz/*
Directories
.
..
.dt
.elm
.fmU26x75p.6f_
.netscape
.wastebasket
40projects
Selected File:
/home/superman/klz/multiplexed.log
OK
Filter
OpenWorks Curve Loader: GDM_TRAINING
File
Edit
Reports
Options
Help
Input Data File:
/home/superman/klz/gdm/alaska/curves/multiplexed.las
Format Type:
ASCII
Media:
Disk
Encapsulation:
None
Format File:
MULTIPLEX.FMT
Scan File:
/home/superman/klz/multiplexed.scan
Log File:
/home/superman/klz/multiplexed.log

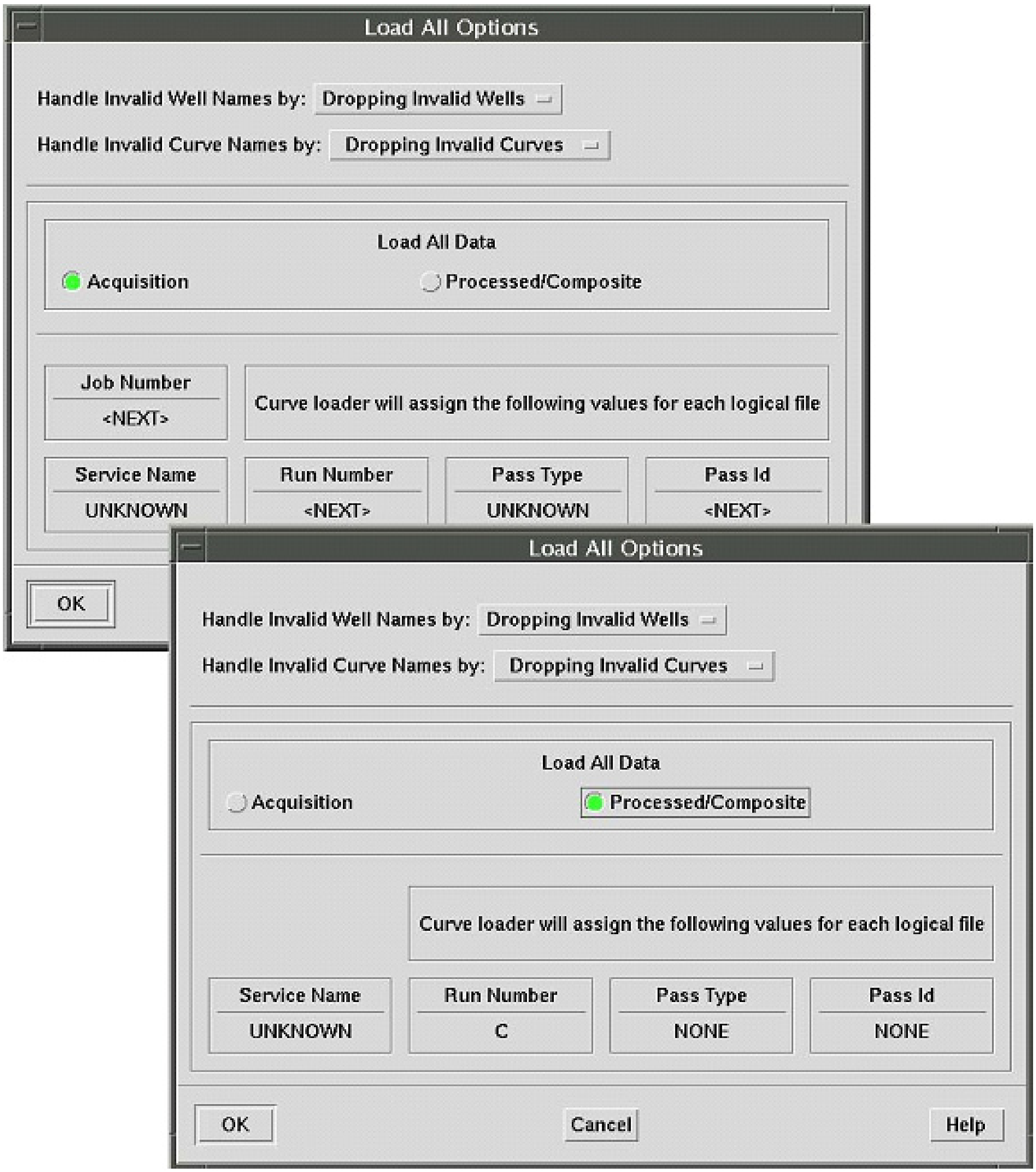
Scanning the Data

Once the inputs are selected, you are ready to scan your data. From the OpenWorks Curve Loader menu bar, select **File > Scan** to test the data and format file for well names and curves types. Scan results are written to the bottom of the Curve Loader window, and also to your selected Scan File.



Loading All Data

Once the inputs are selected and scanned, you are ready to load your data. From the OpenWorks Curve Loader menu bar, select **File > Load All** to load all curves for all wells in your input data file.



The values assigned to Job Number, Run Number, and Pass Type depend on the data type you select.

The fields in the bottom half of this dialog box are for information purposes only. You make three decisions in the Load All dialog box:

- How invalid UWIs are handled
- How invalid curve names are handled
- What type of data you are loading.

The Load All Options box gives you the choice of dropping all invalid wells and curves, or adding them to the project.

Notes

- Any well instances you create are entered into the database with (*x, y*) values of (0,0). You must enter valid (x, y) coordinates for each new well instance to legitimize the wells. You can do this through the OpenWorks Well Data Manager, the ASCII Well Data Loader, or the dialog box that displays when a problem of this type is encountered during loading. Invalid curve names can be either dropped or automatically added to the Curve Dictionary. The Curve Dictionary is discussed in Chapter 6.
- If you add curves to the database, use the Curve Dictionary or Special Units Editor to associate unit types or abbreviations with the curves. These settings affect how curves display in Well Curve Viewer and Well Data Manager.

Recall that acquisition data is associated with a specific “pass” of a logging tool in the wellbore and that processed data is interpreted, or cannot be associated with a specific logging tool pass.

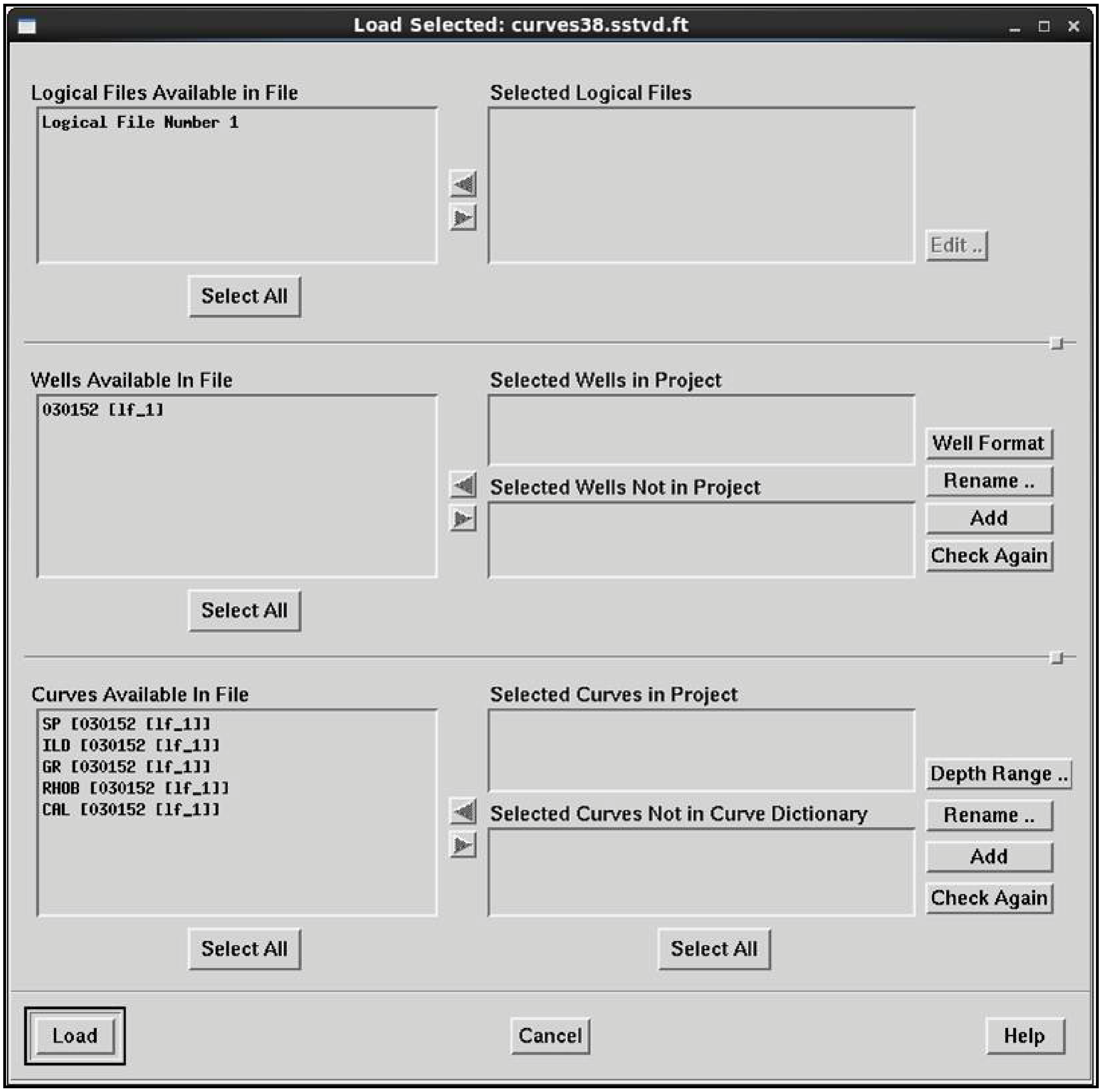
The following table shows how the curve identifiers are constructed for each mode when loading all data:

Curve Name Identifier	Acquisition	Processed/Composite
Job Number	Automatically increments to next available number for each physical file; however, existing OpenWorks job numbers are displayed and selectable when using the Load Select option.	
Service Name	UNKNOWN	UNKNOWN
Run Number	<NEXT> (for each new physical file, all curves are given the next available run number for that well in the OpenWorks database; existing run numbers are displayed and selectable)	c (for composite)
Pass Type	UNKNOWN	UNKNOWN
Pass ID	<NEXT> (usually 0001; however, if a file contains multiple logical files, Pass ID will increment for each logical file that was encountered in a previous logical file within the Load Select cycle for the physical file)	NONE (the identifier that distinguishes a data stream from one pass to another; an acquisition event; a data string with a beginning and an end)
Version	Within each logical file, version number is incremented; the version number is not exposed here	Version numbers are incremented for the following: • Multiple curves with the same name in the same logical field • Curves with the same name in successive logical files in a given physical file • Curves with the same name in successive physical files

Loading Selected Wells and Curves

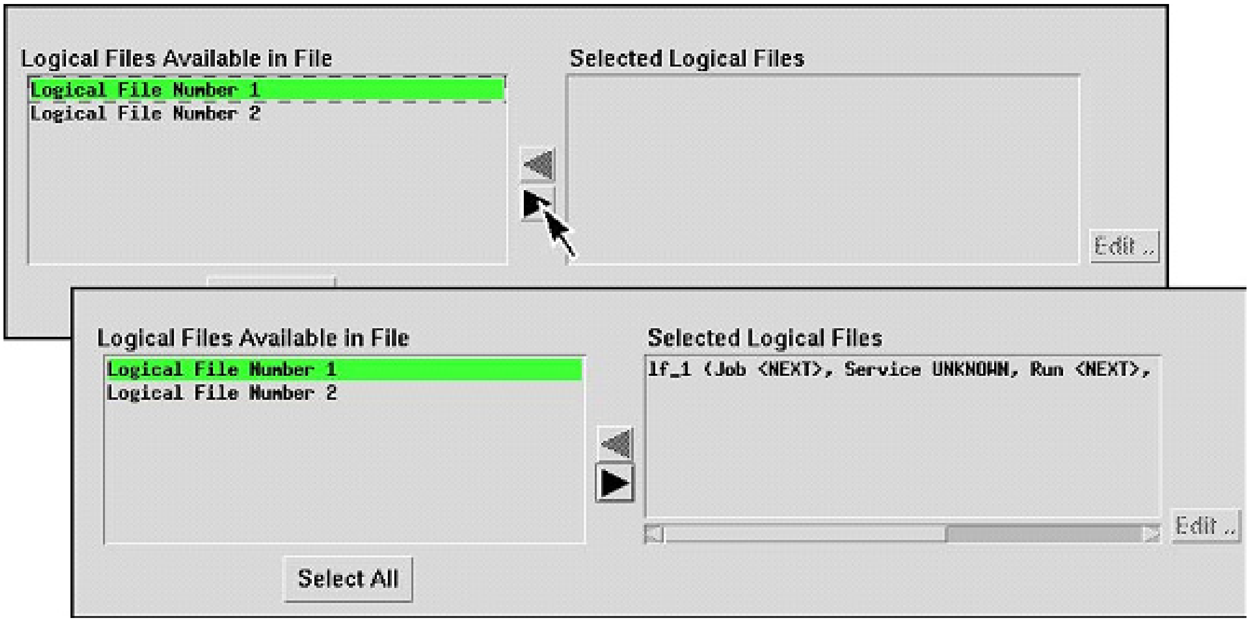
The **File > Load Select** option lets you select the logical files, wells, and curves from your input file that you actually want to load into the database.

You can also modify the job number, service name, run number, pass type, and pass ID for the data in a logical file before you load the data.



Logical Files

A logical file refers to an independent set of data in a binary file. One binary file can contain several logical files. An example is an individual logging run in a file containing multiple logging runs. To select a logical file from which to load data, select an item in the Logical Files Available in File list box.



The Selected Logical Files List displays the job, service name, run, pass type, and pass ID of the selected logical files.

The information for the selected logical files changes depending on whether you have selected any wells and if the wells are in the project.

Editing Curve Identifiers

To edit acquisition data, click a file name in the Selected Logical Files list. Click **Edit**.

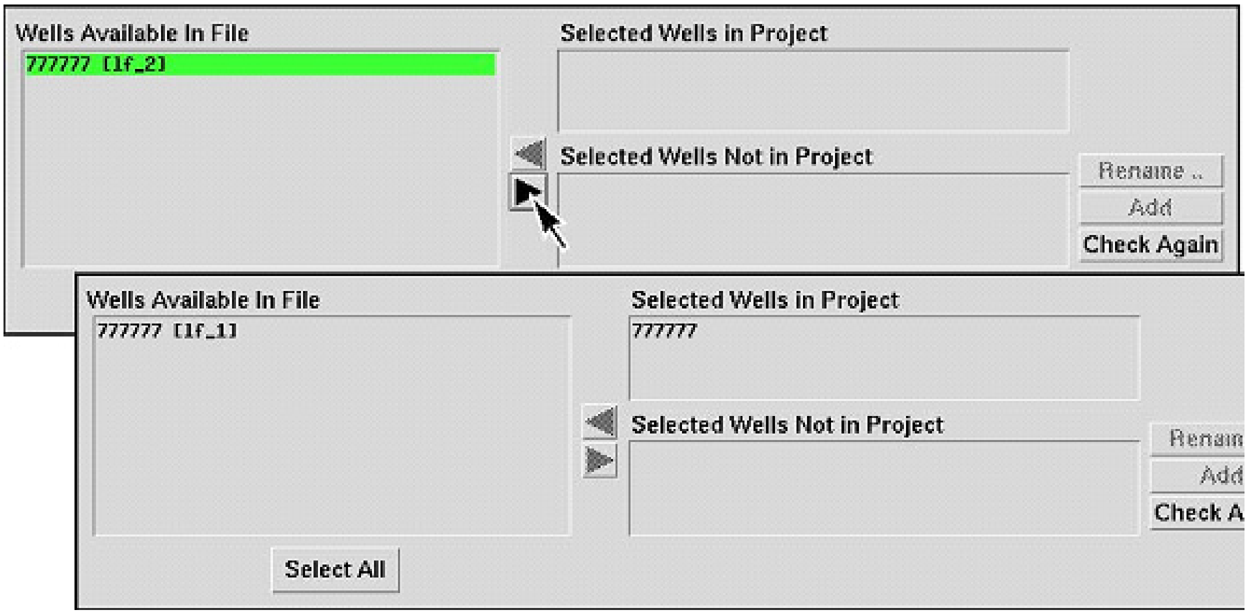
Select **Load As Selected Job** or **Make New Job** from the dialog box. Select a Service Name, Run Number, Pass Type, and Pass ID. The table below explains the basics of these parameters.

Curve Identifier	Description
Service Name	Trade name for the logging service or another name for the tool string. This name may be an aggregate of the tool string's individual mnemonics. Service is a dictionary-controlled string (limited to 40 characters). Project Managers can change and delete names by using the OpenWorks Data Domain Manager. The default is UNKNOWN. When you define a new Service Name, the following parameters also are entered: • Log Service ID (Cannot be changed) • Company • Company Service Name (changed only by project manager) • Data Source • Service Code • Service Name Alias • Service Desc • Remark
Run Number	An OpenWorks serial counter for a specific, named service; each service can have multiple runs. The OpenWorks run does not necessarily correspond directly to the rn number reported at the time the log was acquired, The run number increments automatically to the next available number.
Pass Type	A character string that describes the type of pass.
Pass ID	A four-character, dictionary-controlled, alphanumeric string associated with the selected *Pass Type*.

Once you have selected values for each of the parameters, click **OK**.

Wells and Curves

To select individual wells for loading curves, select them from the **Wells Available in File** list (you can also click on the **Select All** button to highlight all the wells) then click the right arrow.



If the selected well is in the project, the well name moves to the **Selected Wells in Project** list. If the selected well is not in the project, the well name moves to the **Selected Wells Not in Project** list. The curves section in the lower half of this dialog box works the same way.

If a selected well is not already in the project or a selected curve is not in the Curve Dictionary, you have the option of renaming it using the name of a well or curve that is in the project or Curve Dictionary. You can also add the well or curve to the project without changing its name.

Click the name to highlight it, then use the **Rename** button to specify a new name (must be the name of an existing well or curve) or the **Add** button to add it to the project with the existing name. *Recall that wells added to the database in this fashion are assigned (x,y) values of (0,0).*

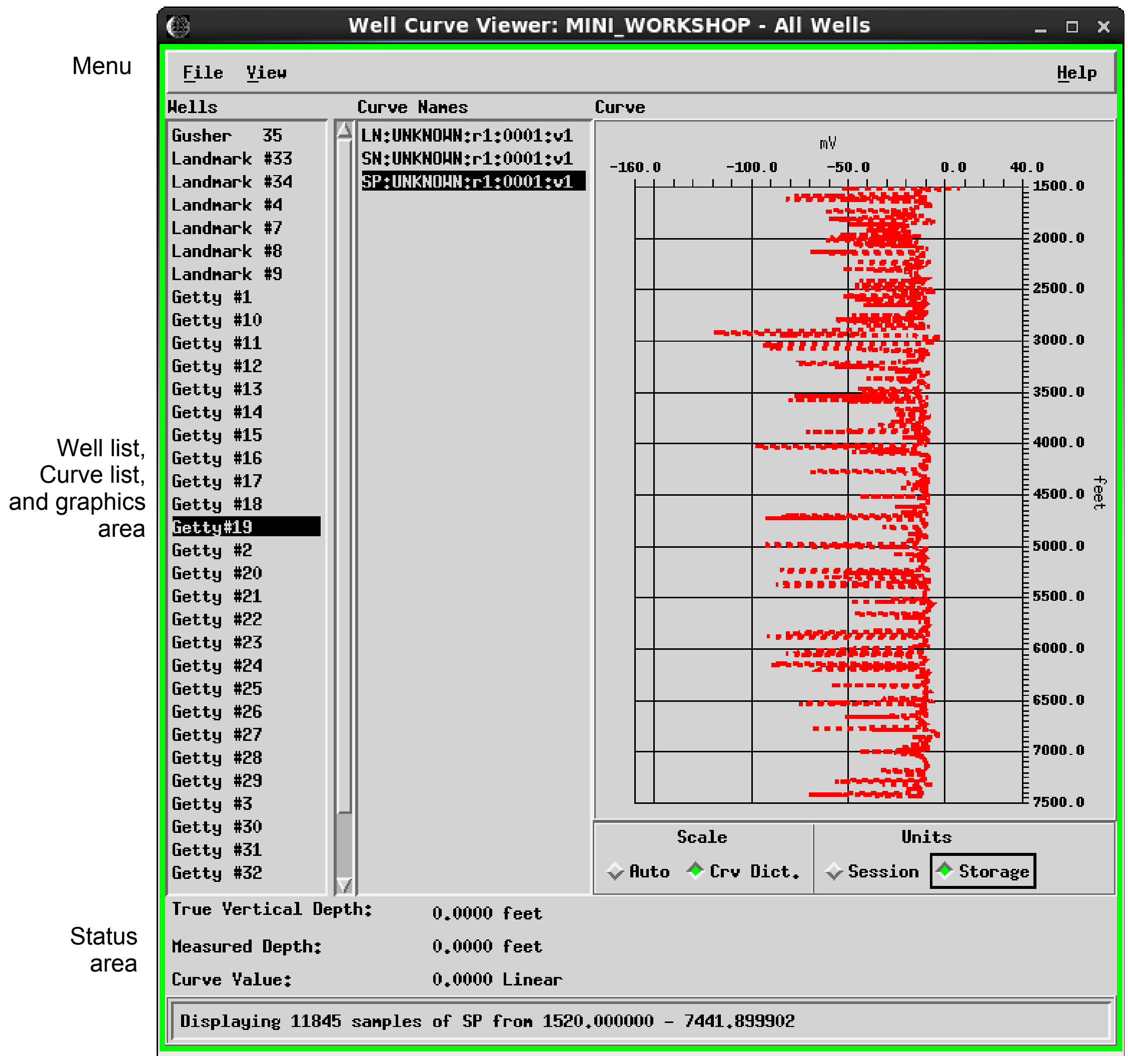
The **Check Again** button allows you to rescan the list of wells or curves. Use this button if you used the Well Data Manager, for example, to add wells or curves to the project without exiting from the Curve Loader.

Well Curve Viewer: An Introduction

A good way to check to see if your curves loaded properly is by using the Well Curve Viewer. The Well Curve Viewer generates quick, single curve displays. Select **Data > Management > Well Curve Viewer**.

Appearance

The Well Curve Viewer main window is shown here.



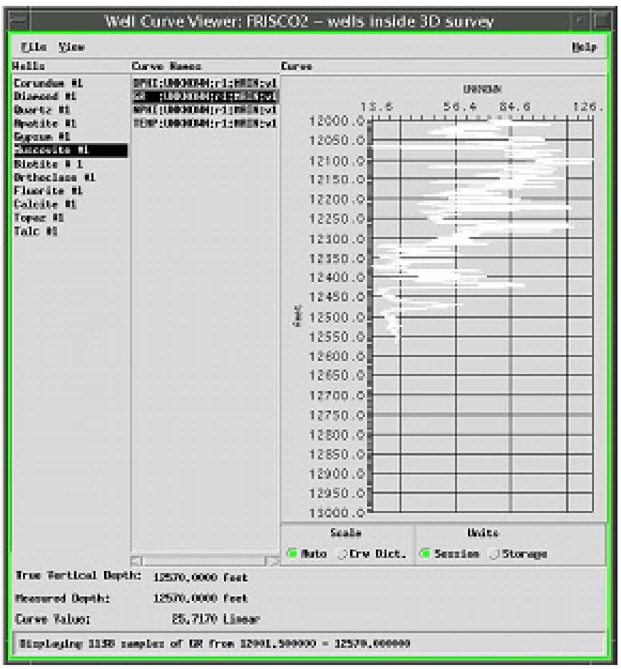
Purpose and Use

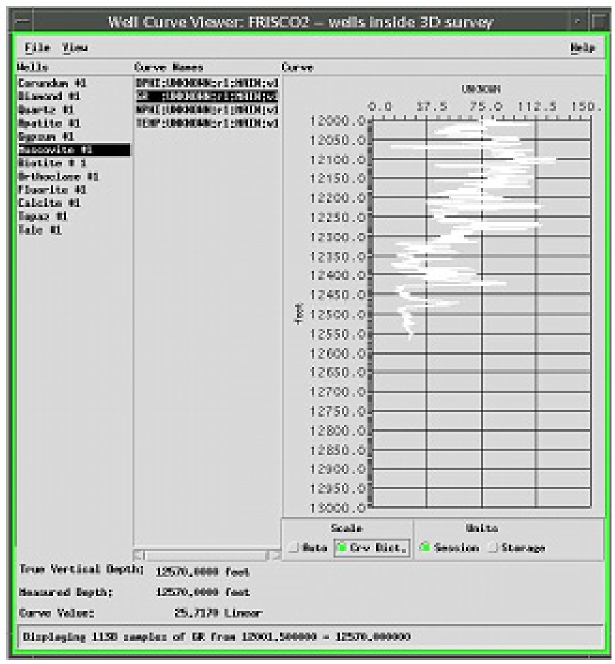
The Well Curve Viewer allows you to:

- Display the well log curves of your choice, one at a time.
- Display curves in either Automatic or Curve Dictionary mode.

With Automatic mode, the curve is displayed using left and right amplitudes defined by the curves' actual minimum and maximum values. This method shows you at a glance, the range of values found in your selected curve.

With Curve Dictionary mode, the curve is displayed using left and right amplitudes defined in OpenWorks Curve Dictionary utility.





Display curves in either Session or Storage units of measure.

In the exercises that follow, you will format and load serial and multiplexed curve data. You verify the curve loads using the Well Curve Viewer and Well Data Manager.

Exercise 5-1. Formatting and Loading Serial Curve Data

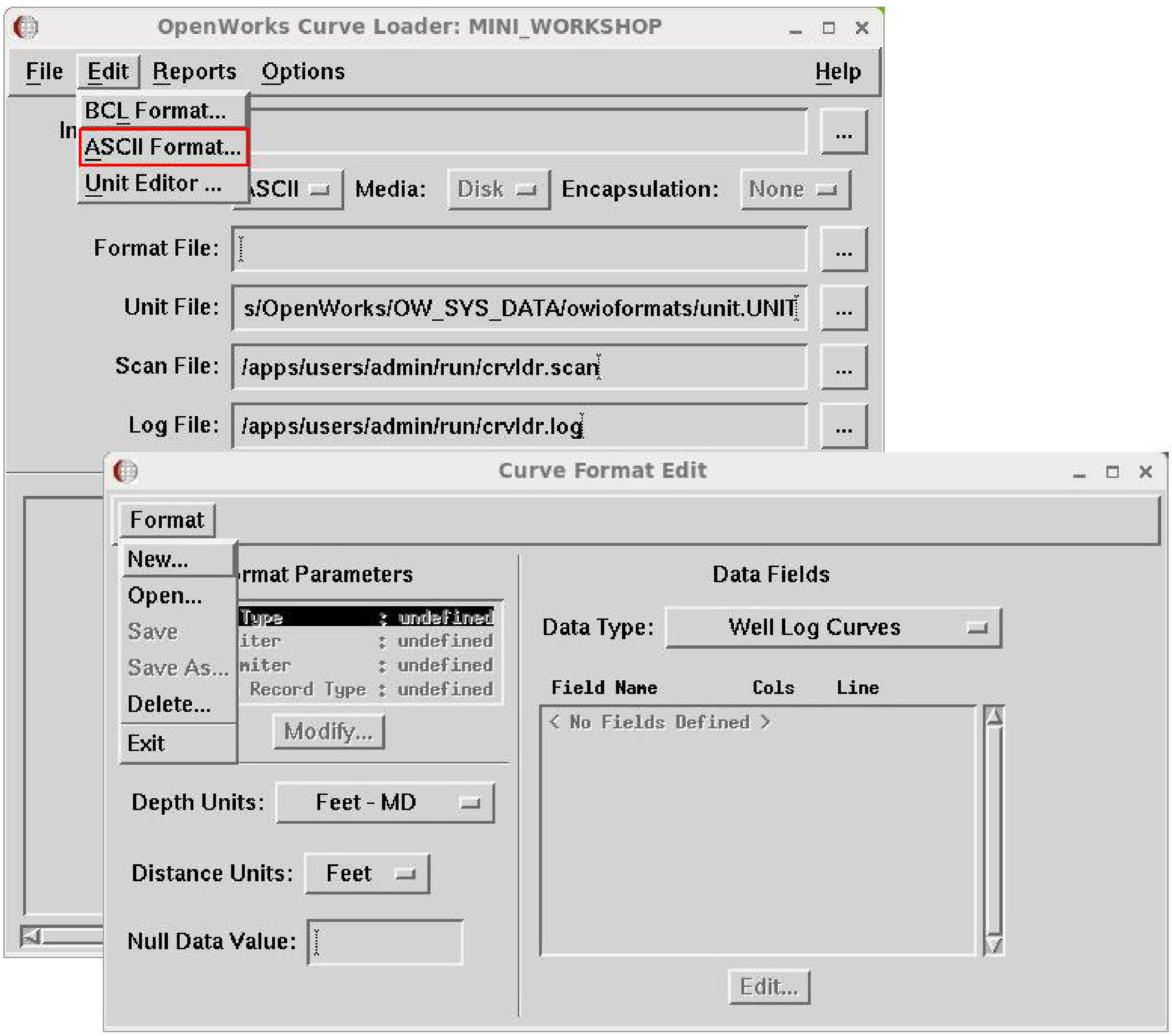
1. Make sure that MINI_WORKSHOP is still selected. If not, use **Project > Project Status** to change the project.

2. Initialize the Curve Loader by selecting **Data > Import > Curve Import (Classic)** from the OpenWorks command menu.

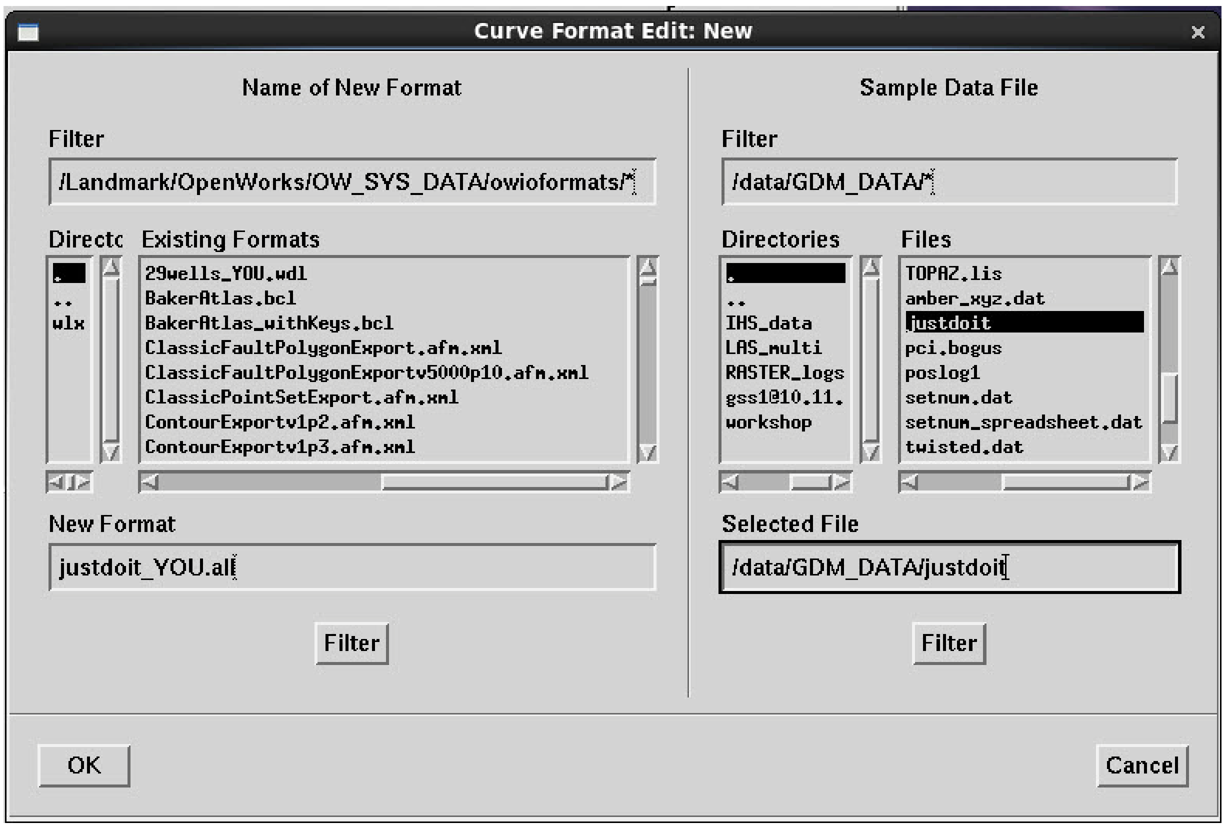
   Change Format Type to **ASCII**.

3. Select **Edit > ASCII Format** from the Curve Loader menu.

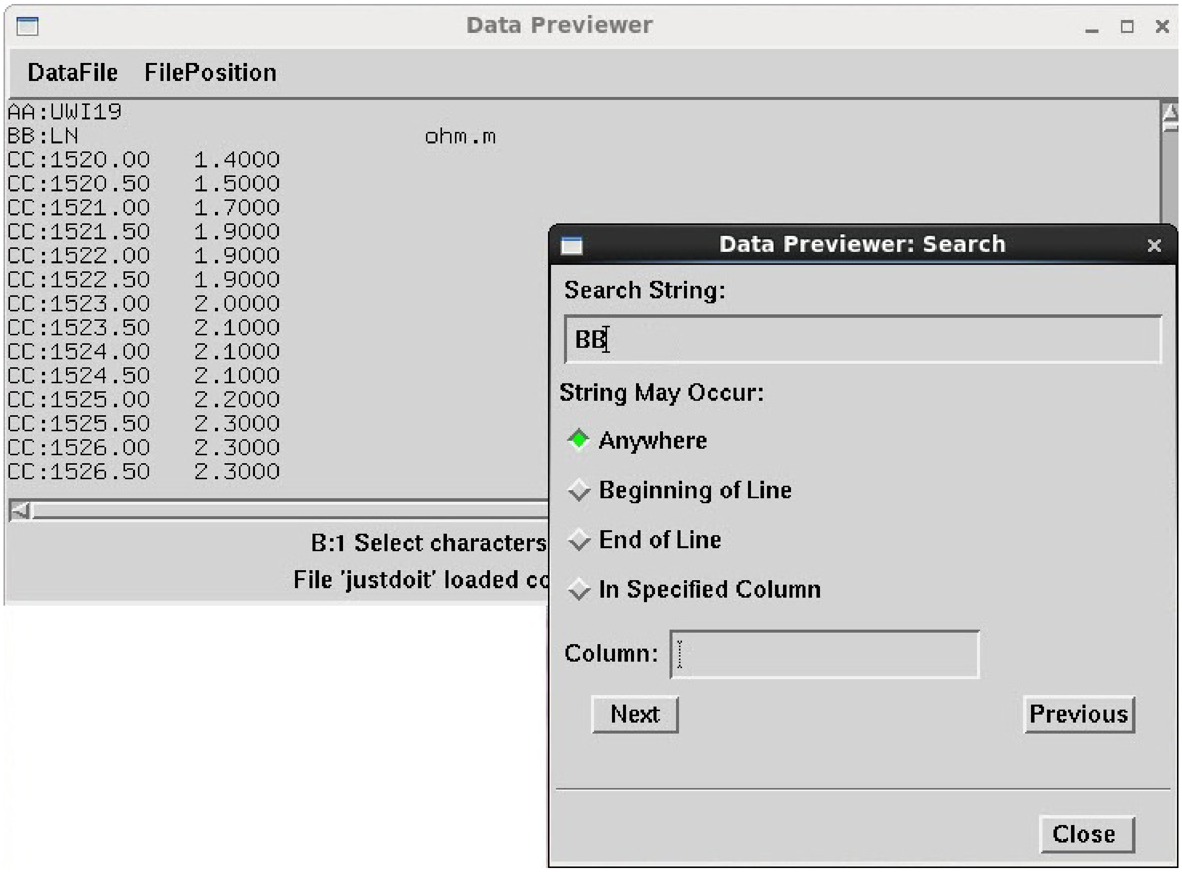
4. Select **Format > New** from the Curve Format Edit dialog box.



5. Use the Filter to select the data file `justdoit` on the right side of the Curve Format Edit dialog box. In the New Format field, enter a name for the new format such as `justdoit_YOU.all`. Make sure you save the format to the `OW_SYS_DATA/owioformats` directory (as explained in Chapter 3). Select **OK**.



6. The Data Previewer displays. Examine the data file with the **FilePosition > Search** option to determine how many wells and curves are in the file. (Highlight **BB** in the Data Previewer, click on **Anywhere**, then click on **Next**.)



7. Close the Data Previewer:Search dialog box, and use **FilePosition > Show First Line** to return to the top of the file.

8. Select the parameter **Record ID Type** in the Format Parameters section of the Curve Edit Format window then press the **Modify** button. Select **Marker**. Use the cursor in the Data Previewer window to select the marker location or type in the column numbers (1-3). Click **OK**.

9. Select **Well Delimiter** in the Format Parameters window and select **Modify**. Set the Well Delimiter to either **Beginning of Well Marker** or **Name**. If you select **Beginning of Well Marker**, go back to the Data Previewer and use the cursor to select the appropriate marker flag on the line containing the well UWI. This will automatically fill in the **Value** and **Cols** fields in the dialog box. If you select **Name**, new wells will be detected automatically when there is a change in well name. Click **OK**.

10. Select **Curve Delimiter** in the Format Parameters window and select **Modify**. Set the Curve Delimiter to either **Beginning of Curve Marker** or **Name**.

    If you select **Beginning of Curve Marker**, go back to the Data Previewer and use the cursor to select the appropriate marker ("BB") on the first line of curve data. This will automatically fill in the **Value** and **Cols** fields in the dialog box. If you select **Name**, new curves will be detected automatically when there is a change in curve name. Click **OK**.

11. Select **Curve Data Record Type** in the Format Parameters window and select **Modify**. Select **Serial**. Click **OK**.

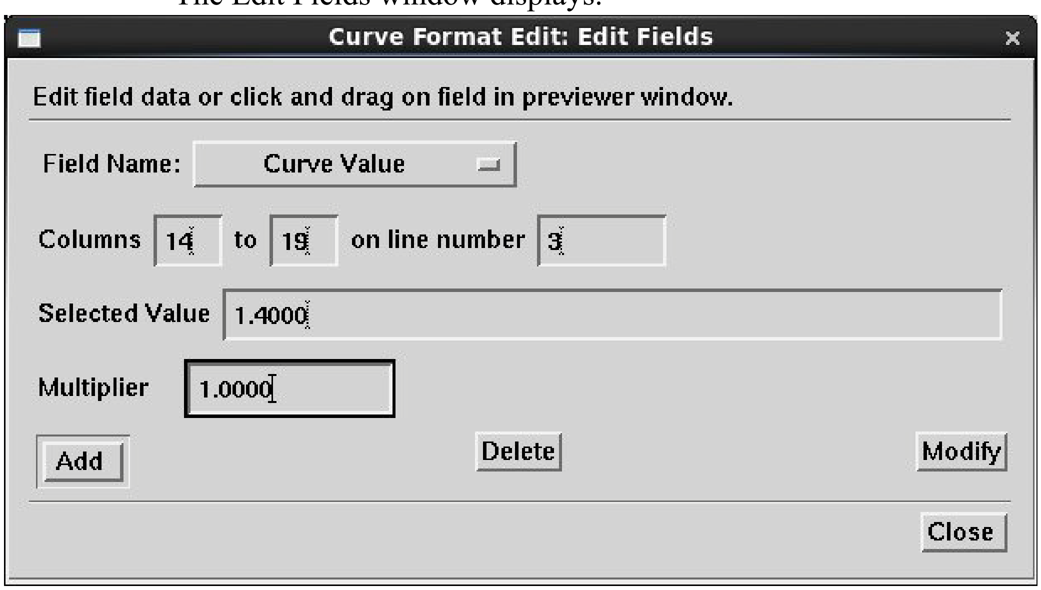
12. Set the **Depth Units** to **Feet - MD**.

13. Set **Distance Units** to **Feet**.

14. Set the **Null Data Value** to **-888.0**.

15. Use the Data Type list to select **Well Log Curves** and then click the **Edit** button.

    The Edit Fields window displays.

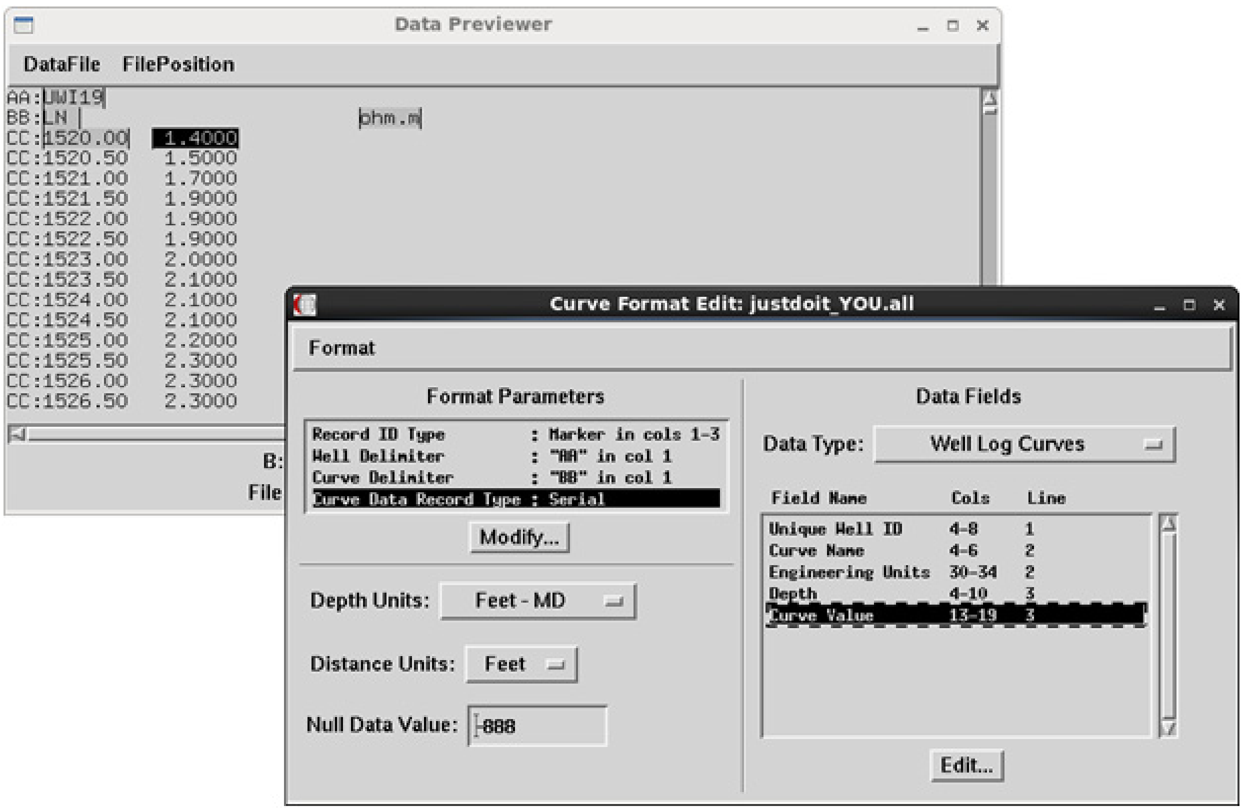


16. Format the fields below, clicking **Add** after each one.

Field Name	Columns	Line
Unique Well ID	4 to 8	1

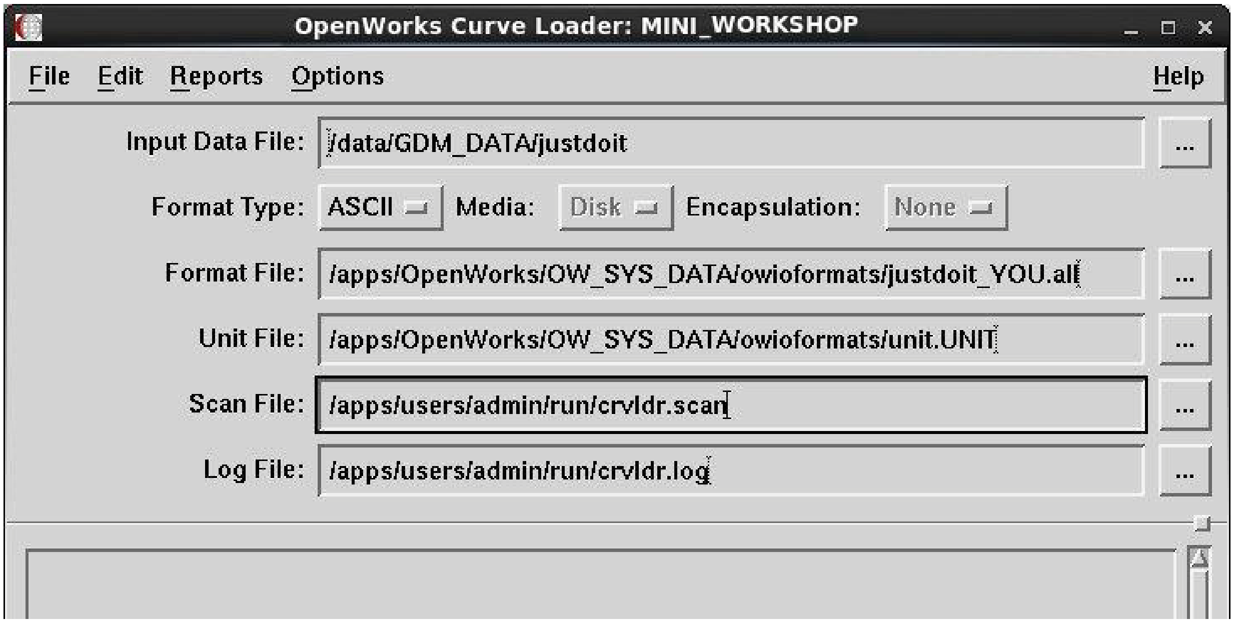
Field Name	Columns	Line
Curve Name	4 to 6	2
Engineering Units	30 to 34	2
Depth of Measurement	4 to 10	3
Curve Value	13 to 19	3

17. After clicking **Add** each time, check the Data Previewer to make sure the correct data is highlighted.



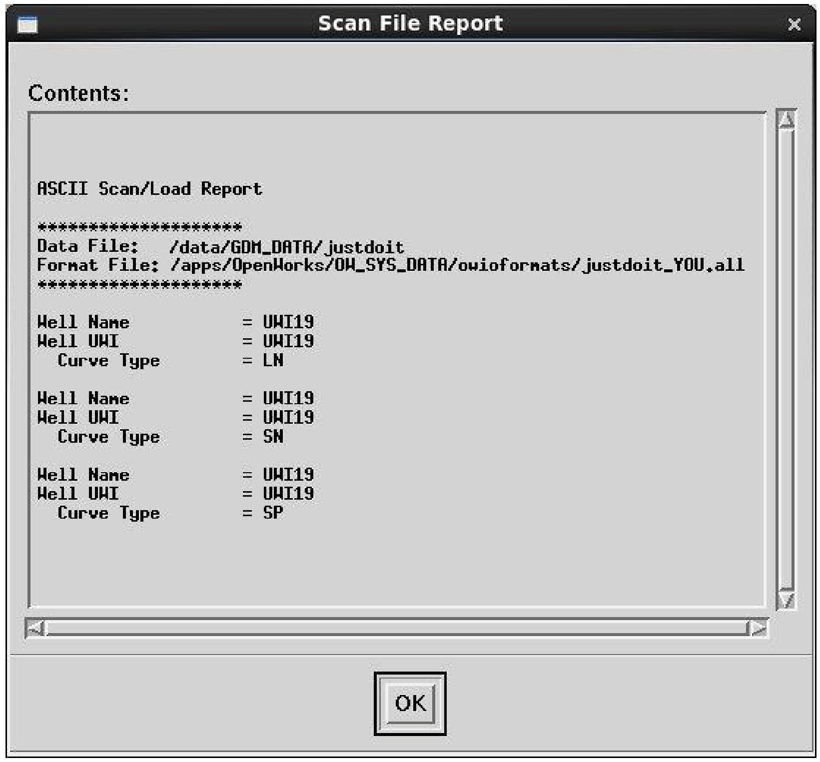
18. Close the Edit Fields dialog box, and save your format with **Format > Save (Needed)** from the Curve Format Edit window.

19. In the Curve Loader window, set the Format Type to **ASCII**, select `justdoit` as the Input Data File, and select the format file you just created and saved.



20. Select **File > Scan** from the Curve Loader window.

    The scanned data displays in the bottom half of the window. When the data is finished loading, you can view it the Scan File Report (select **Reports > Scan Report**).



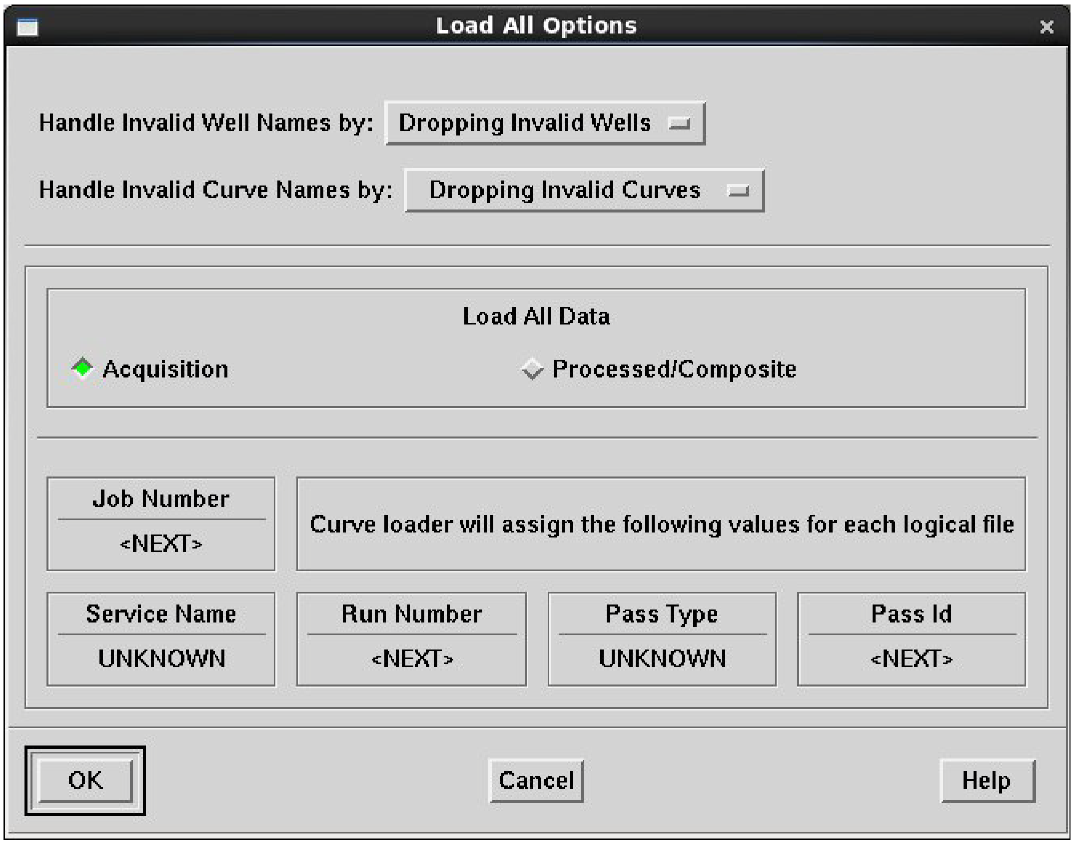
21. Click **OK** to dismiss the Scan File Report dialog box.

22. Select **File > Load** All from the Curve Loader window.

    Handle invalid well names by **Dropping Invalid Wells** so that new wells will not be created if they are not already in the project.

    Handle invalid curve names by **Adding to Curve Dictionary**.

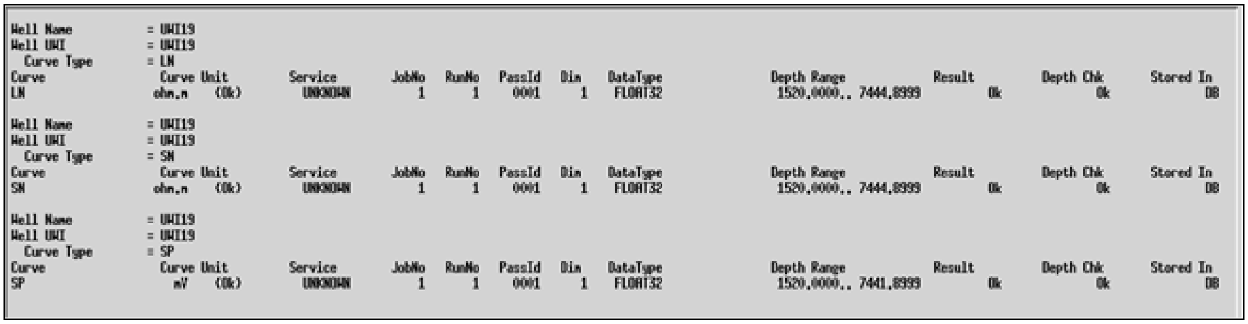
    Select **Acquisition** as the data type.



23. Select **OK** to begin the load.

> **Note**
>
> If you are prompted to update X/Y Coordinates, select **Update None** and **Continue** each time this confirmation dialog box displays.

24. Monitor the load progress in the lower half of the Curve Loader window. When finished, select **Close** in the Load All dialog box.


```
Well Name        = UWI19
Well UWI         = UWI19
  Curve Type     = LN
Curve             Curve Unit      Service     JobNo   RunNo   PassId   Dim   DataType         Depth Range             Result      Depth Chk      Stored In
LN               ohm.m    (Ok)     UNKNOWN        1       1     0001     1    FLOAT32          1520.0000.. 7444.8999       Ok             Ok             DB

Well Name        = UWI19
Well UWI         = UWI19
  Curve Type     = SN
Curve             Curve Unit      Service     JobNo   RunNo   PassId   Dim   DataType         Depth Range             Result      Depth Chk      Stored In
SN               ohm.m    (Ok)     UNKNOWN        1       1     0001     1    FLOAT32          1520.0000.. 7444.8999       Ok             Ok             DB

Well Name        = UWI19
Well UWI         = UWI19
  Curve Type     = SP
Curve             Curve Unit      Service     JobNo   RunNo   PassId   Dim   DataType         Depth Range             Result      Depth Chk      Stored In
SP                  mV    (Ok)     UNKNOWN        1       1     0001     1    FLOAT32          1520.0000.. 7441.8999       Ok             Ok             DB
```

Exercise 5-2. Checking the Loaded Curve

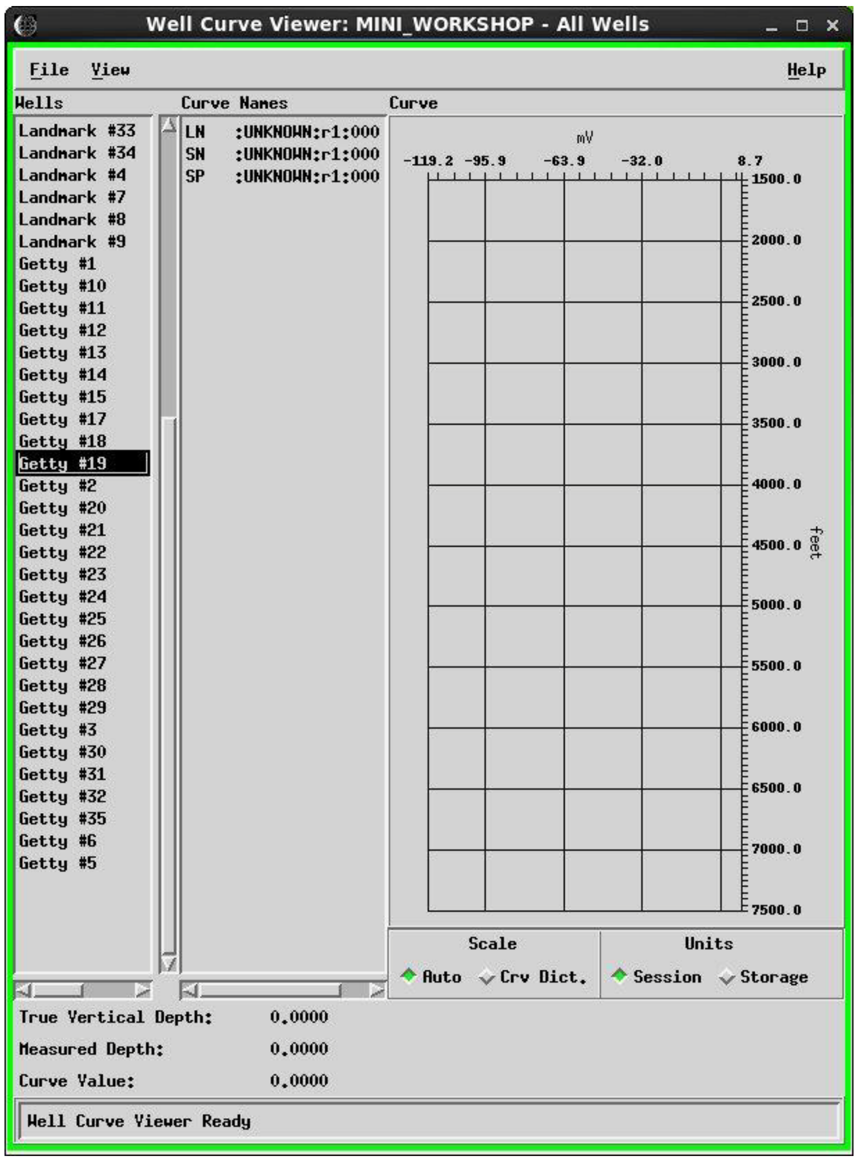
A good way to check to see if your curves loaded properly is by using the Well Curve Viewer or WOW™ software.

In Well Curve Viewer, do the following:

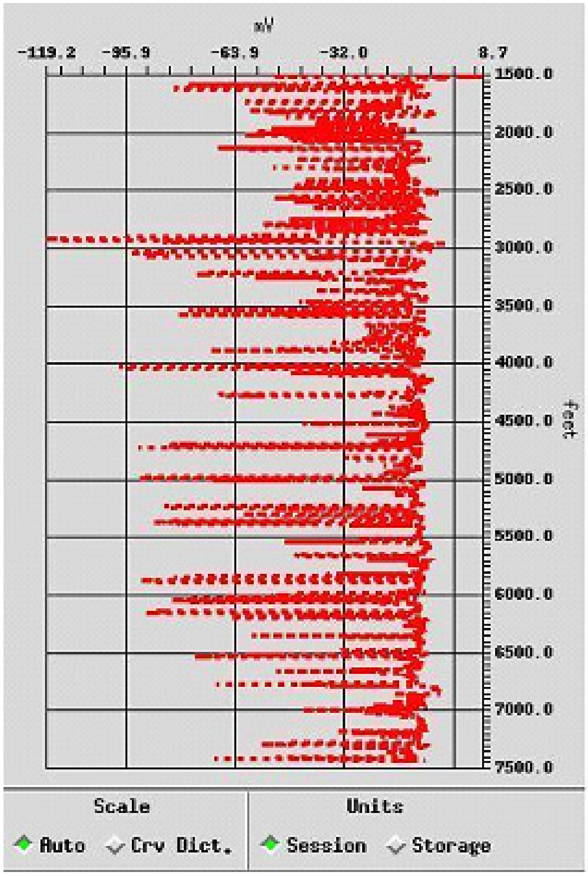
1. Select **Data > Management > Well Curve Viewer** from the OpenWorks Command Menu. If you have not previously selected a well list, you are prompted to do so now.

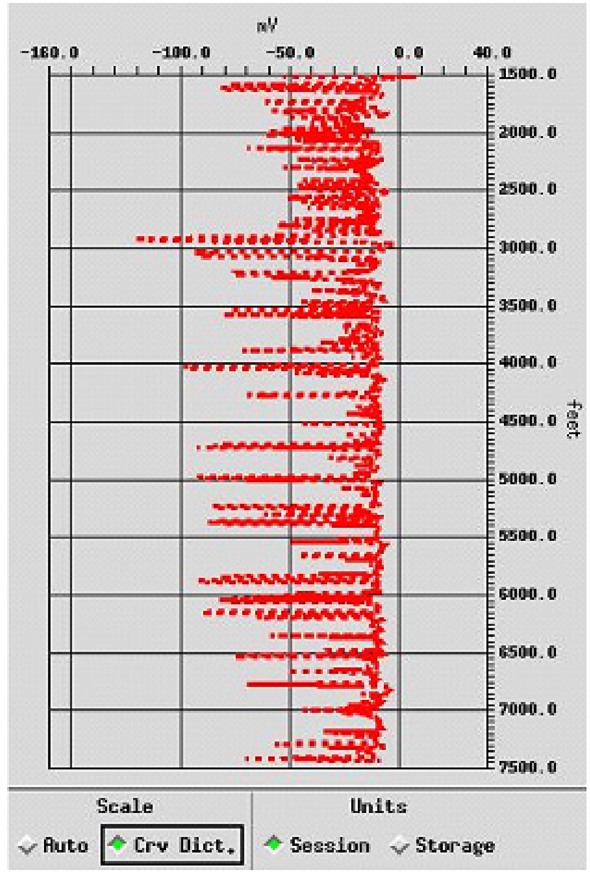
2. Select **File > Read All** from the Well Curve Viewer menu. All well names in the current Well List display in the Wells column.

3. Scroll down the Wells column and select **Getty #19**. The curves loaded in the previous exercise display in the Curve Names list.



Select the curve name **SP** and toggle between **Auto** and **Crv Dict**. **Auto** shows the minimum and maximum curve values that were just loaded from your ASCII file. **Crv Dict**. shows the default amplitude settings for that curve from the Curve Dictionary. (The Curve Dictionary is discussed in detail in the next chapter.)





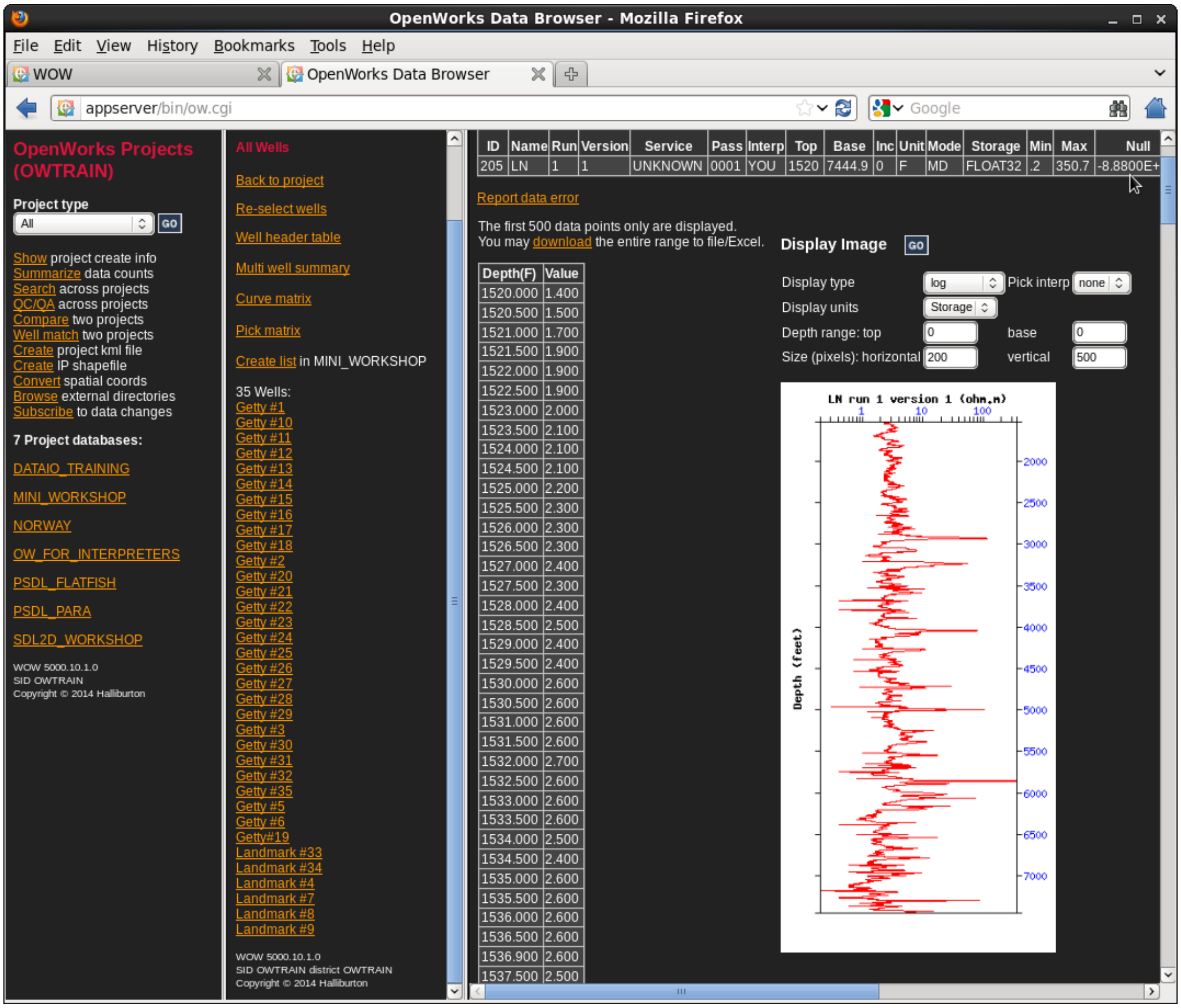
4. Take a quick look at your LN and SN curves and then exit the Well Curve Viewer.

In WOW software:

1. Enter `http://<your machine name here>/` in your browser window.
2. Click the **OpenWorks** software in the left pane of the WOW software main window.
3. Click **MINI_WORKSHOP**. Click on the number next to **Wells** in the Main Data table. A list of MINI_WORKSHOP Wells displays.
4. Click **Getty #19**. A table showing data from Getty #19 displays.
5. Click **3** next to curves. A **Curves** table displays.

6. Click the arrow in the **View** column for the first curve. A window will display showing details of the load.

7. Change **Display type** to **log** and click **Go**.

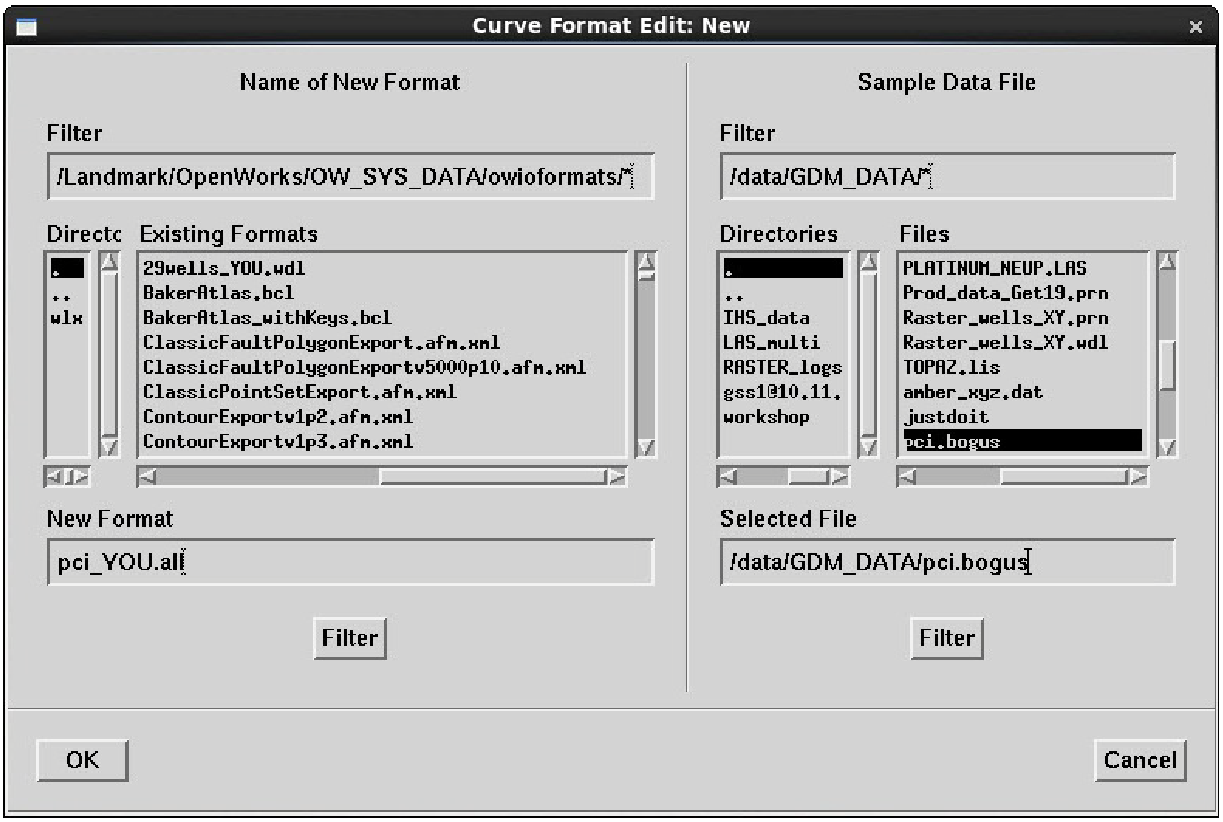


Exercise 5-3. Formatting and Loading Multiplexed Curve Data

1. Select **Edit** > **ASCII Format** from the Curve Loader menu.

2. Select **Format** > **New** from the Curve Format Edit dialog box.

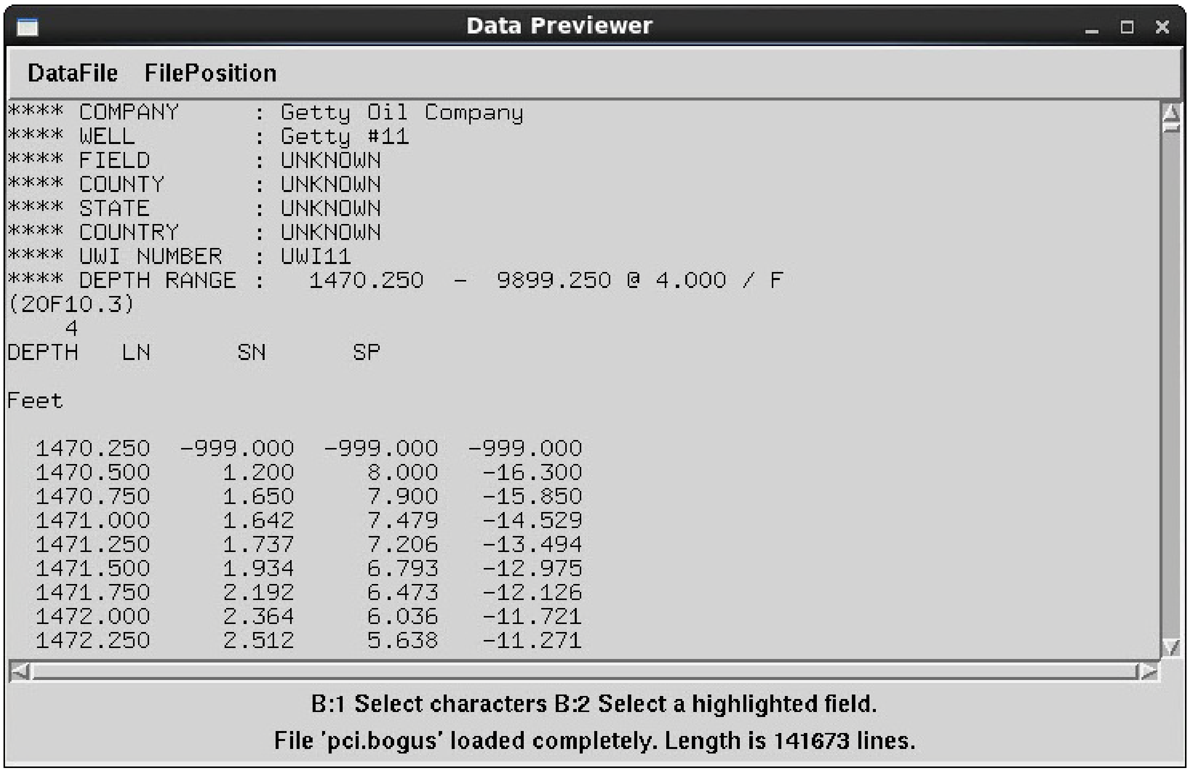
   This loads the Curve Format Edit: New dialog box.



3. Use the **Filter** under Sample Data File (right side) to change to your training data directory and then select the data file `pci.bogus`.

   Use the Filter under Name of New Format (left side) to change to the **OW_SYS_DATA/owioformats** directory and enter a **New Format** name: **`pci_YOU.all`**. Select **OK** to create the new format and close this dialog box.

   This opens the **Data Previewer** window with the contents of the **pci.bogus** data file.



4. Using the techniques learned in the last exercise, examine the data file with the **FilePosition options** to determine how many wells and curves are in the file.

5. Select the parameter **Record ID Type** in the Format Parameters section of the Curve Edit Format window then press the **Modify** button. Select **Count**. Press **OK**.

6. Select **Well Delimiter** in the Format Parameters window and select **Modify**. Set the Well Delimiter to **Beginning of Well Marker**, and highlight ****** COMPANY** in line 1 of the Data Previewer display. This character string uniquely identifies the beginning of a new well. Click **OK**.

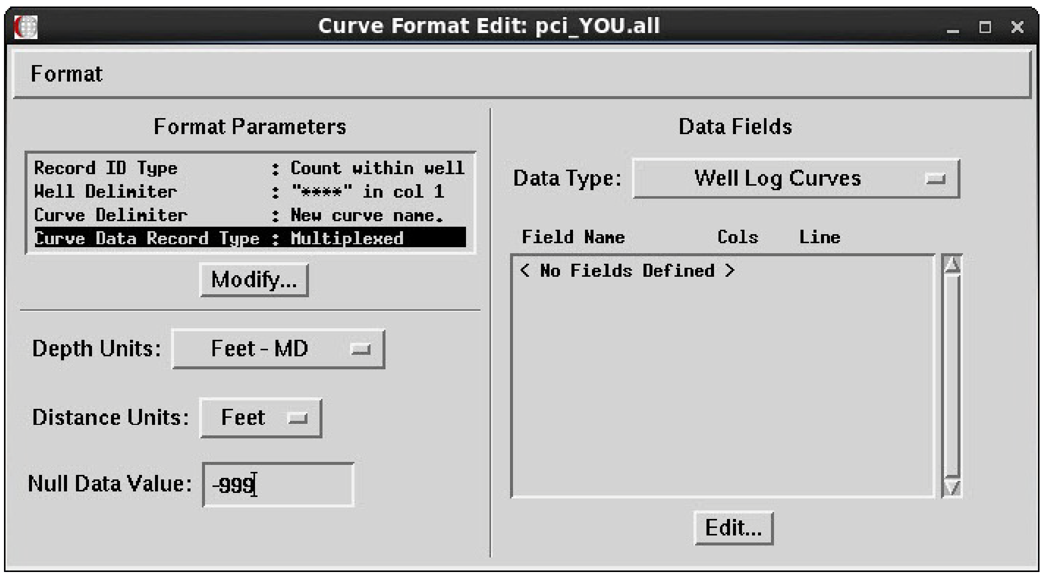
7. Select **Curve Delimiter** in the Format Parameters window and select **Modify**. Set the Curve Delimiter to **Name**. Click **OK**.

8. Select **Curve Data Record Type** in the Format Parameters window and select **Modify**. Select **Multiplexed**. Press **OK**.

9. Set the **Depth Units** to **Feet - MD**.

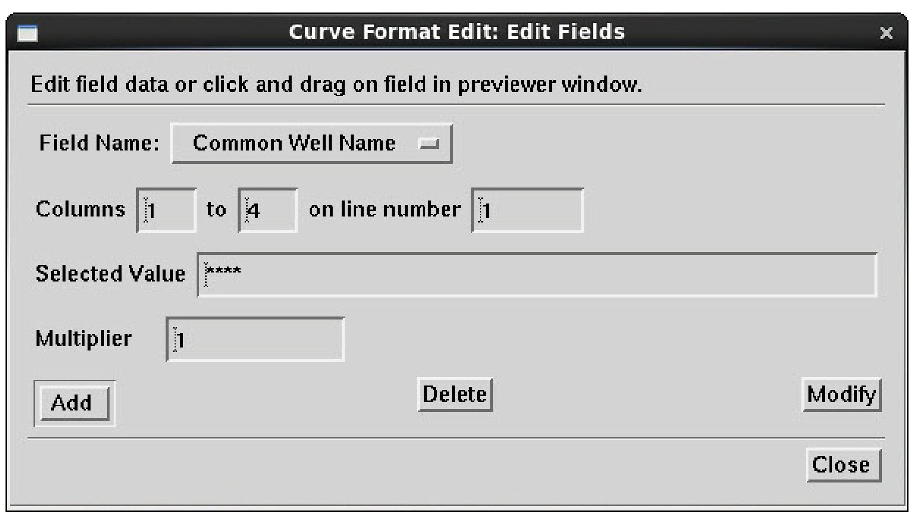
10. Set **Distance Units** to **Feet**.

11. Set the **Null Data Value** to **-999.0**.



12. From the Data Type list, select **Well Log Curves**, and click the **Edit** button.

    The *Edit Fields* window displays.

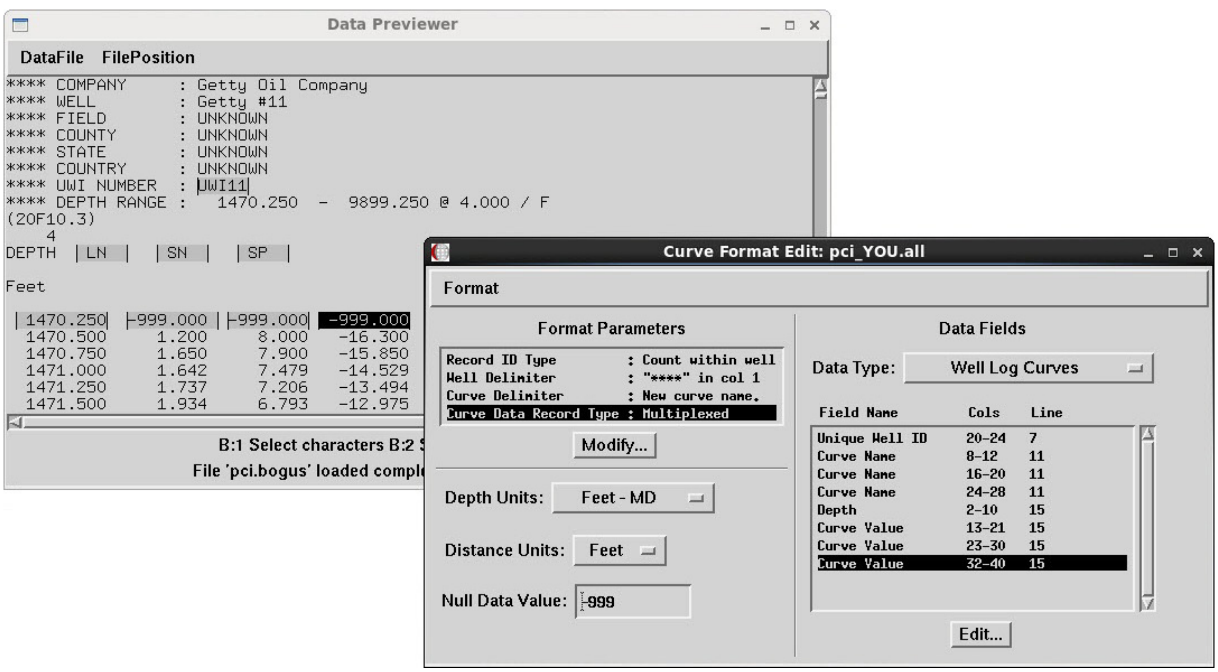


13. Format the following fields:

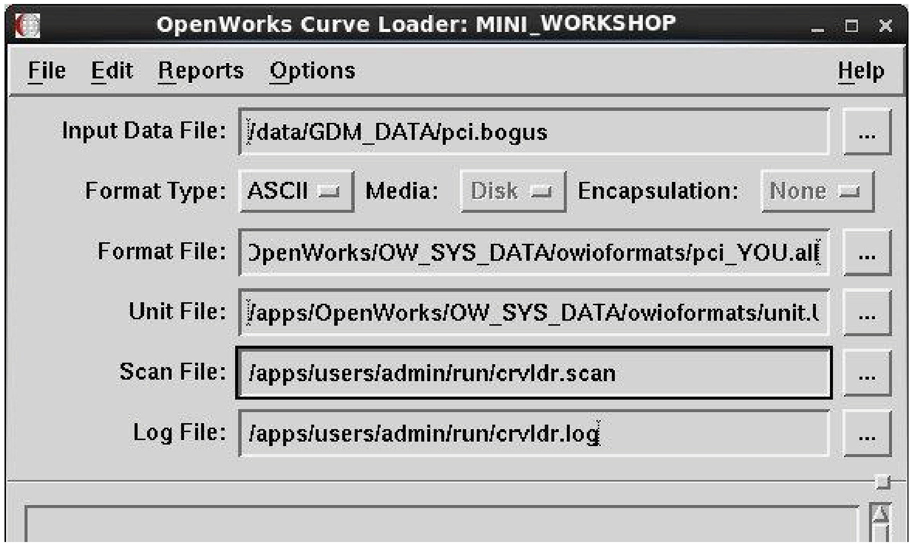
Field Name	Columns	Line
Unique Well ID	20 to 24	7
Curve Name	8 to 12	11
Curve Name	16 to 20	11
Curve Name	24 to 28	11
Depth of Measurement	2 to 10	15
Curve Value	12 to 20	15
Curve Value	22 to 30	15
Curve Value	32 to 40	15

14. Close the Edit Fields dialog box, and save your format with **Format > Save** from the Curve Format Edit window.

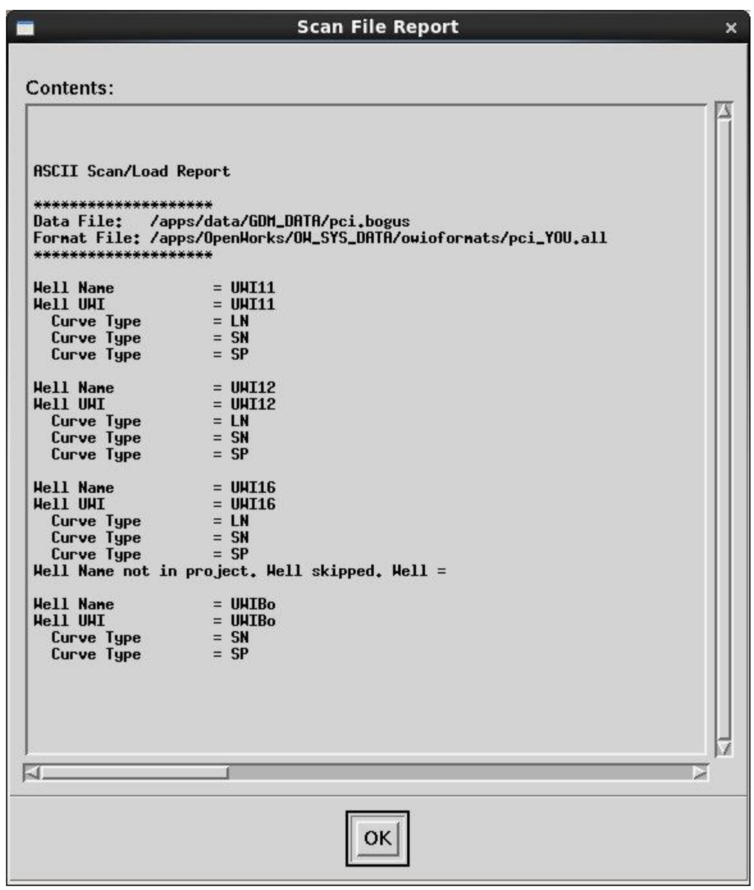
    Your display should now look like the following examples:



15. In the Curve Loader window, set the Format Type to **ASCII**, select **pci.bogus** as the Input Data File, and select the Format File you just created and saved.



16. Select **File > Scan** from the Curve Loader window. The scanned data displays in the bottom half of the window, and in the Scan File Report (select **Reports > Scan Report**).



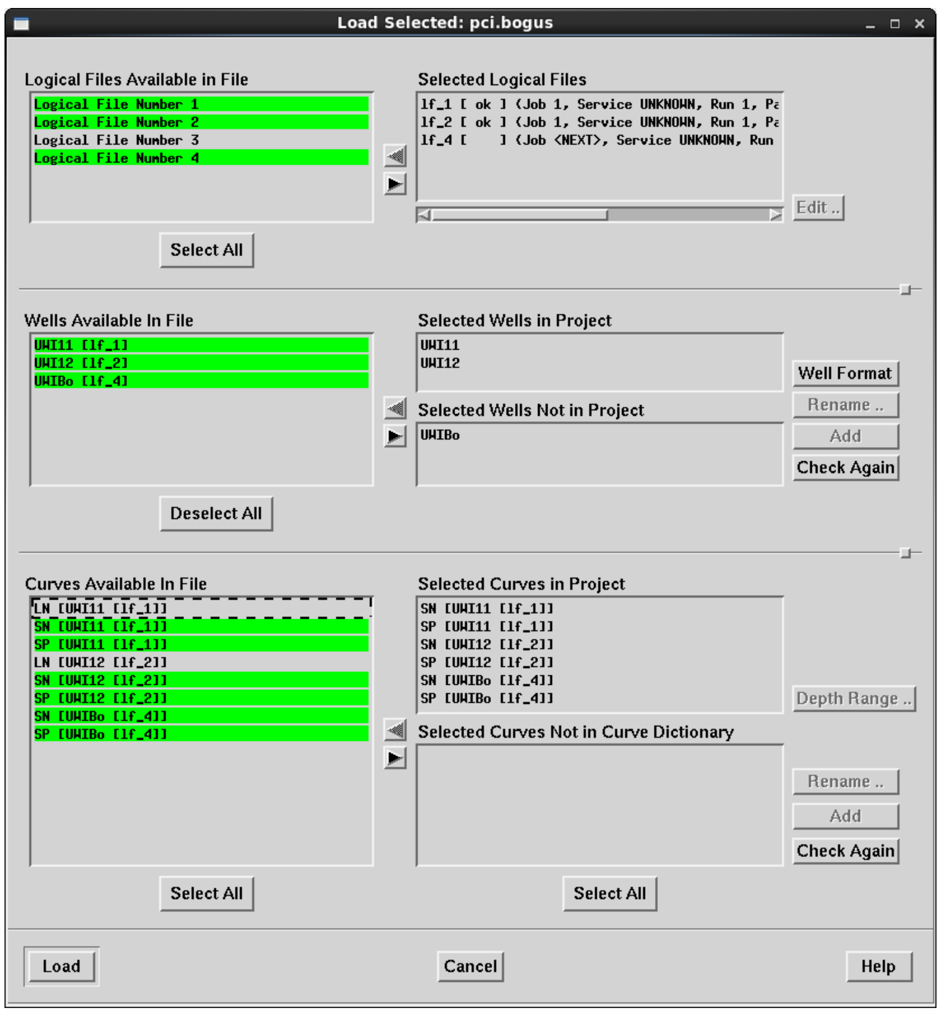
17. Click **OK** to dismiss the Scan dialog box.

18. Select **File > Load Select** from the Curve Loader menu.

    Under Logical Files Available in File select **Logical File Number 1**, **Logical File Number 2**, and **Logical File Number 4**. Click the arrow to move these wells from the *Available* to the *Selected* side of the Load Selected window.

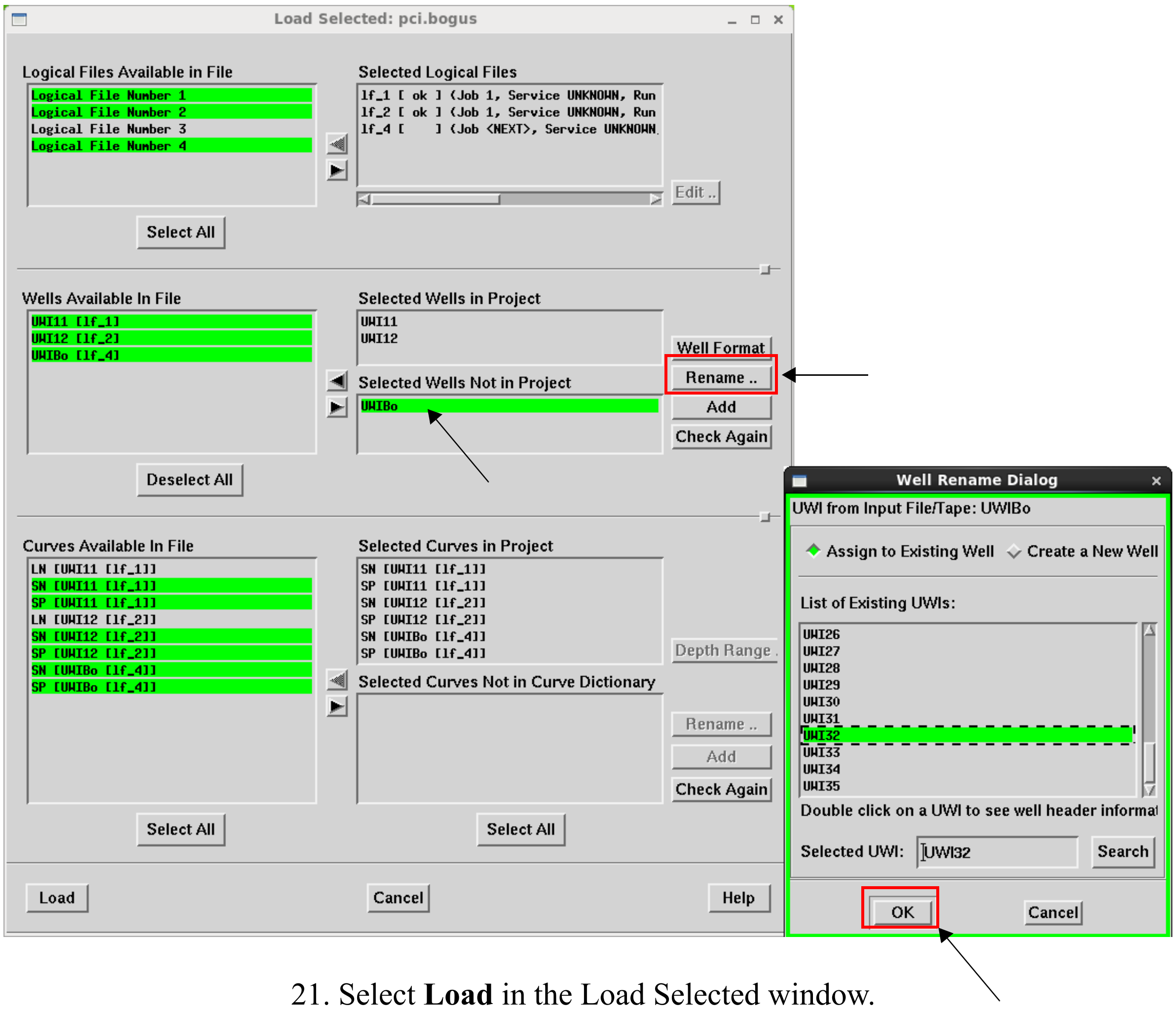
    Under Wells Available In File, highlight wells **UWI11**, **UWI12**, and **UWIBo**. Click the arrow to move these wells from the *Available* to the *Selected* side of the Load Selected window. Notice that UWIBo ends up under Selected Wells Not in Project, while the other wells end up under Selected Wells In Project.

    Under **Curves Available In File**, highlight all **SN** and **SP** curves.Click the arrow to move these curves from the *Available* to the *Selected* side of the *Load Selected* window.



19. Highlight the well **UWIBo**. Use the **Rename** button to change the name of well **UWIBo** to **UWI32 (Getty #32)**.

20. Click **OK**.



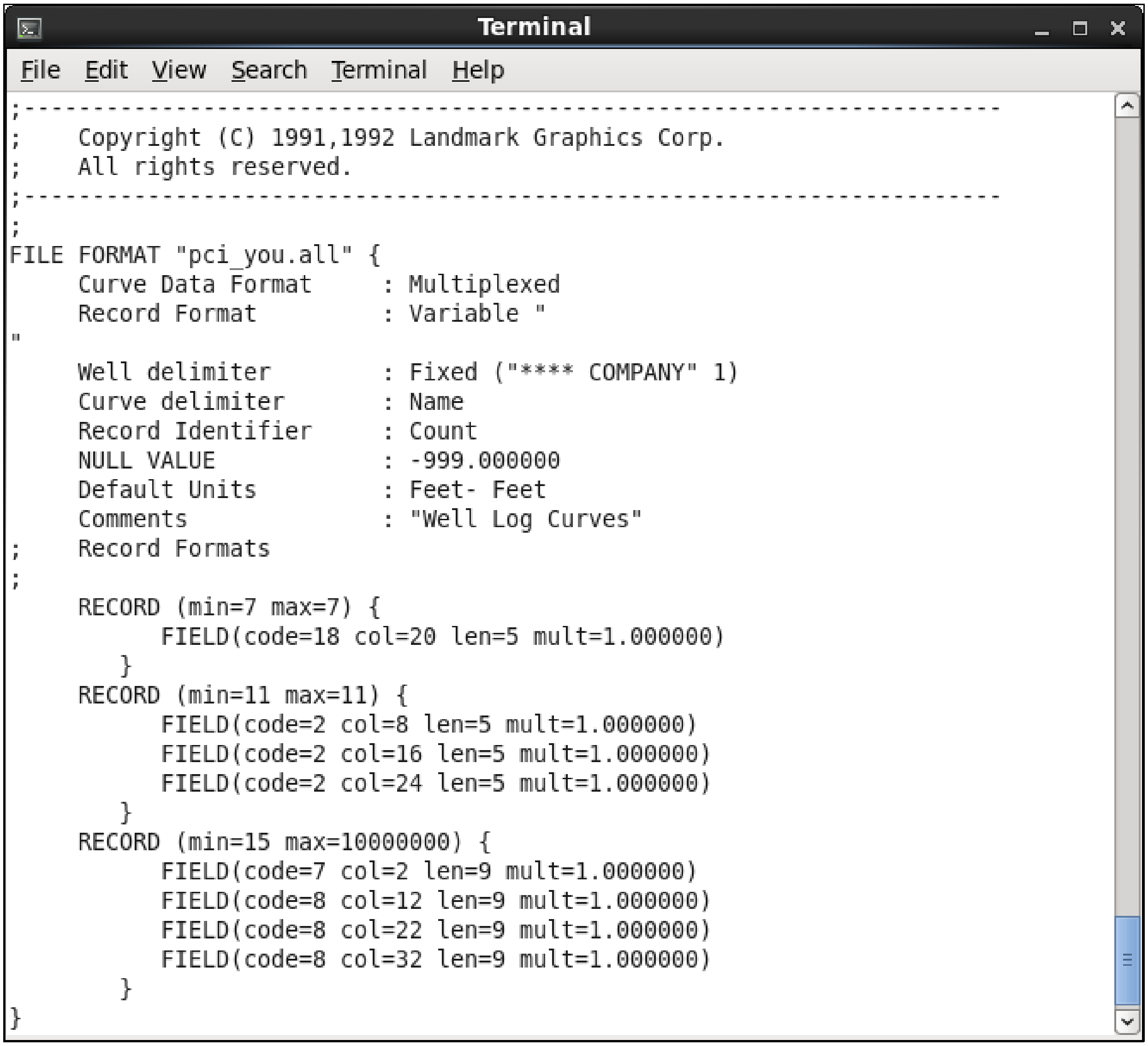
21. Select **Load** in the Load Selected window.

> **Note**
>
> If you are prompted to update X/Y Coordinates, select **Update None** and **Continue**.

22. When the load is complete, click **Close** to close the Load Selected window.

23. Examine your format file from the command line. Refer to the information on Field Definitions to identify the codes.

    - In an xterm type: **`cd /directory_path/OW_SYS_DATA/owioformats`**
    - Type: `more pci_YOU.all`



```
Terminal
File Edit View Search Terminal Help
;--------------------------------------------------------------------
;    Copyright (C) 1991,1992 Landmark Graphics Corp.
;    All rights reserved.
;--------------------------------------------------------------------
;
FILE FORMAT "pci_you.all" {
     Curve Data Format     : Multiplexed
     Record Format         : Variable "
"
     Well delimiter        : Fixed ("**** COMPANY" 1)
     Curve delimiter       : Name
     Record Identifier     : Count
     NULL VALUE            : -999.000000
     Default Units         : Feet- Feet
     Comments              : "Well Log Curves"
;    Record Formats
;
     RECORD (min=7 max=7) {
           FIELD(code=18 col=20 len=5 mult=1.000000)
        }
     RECORD (min=11 max=11) {
           FIELD(code=2 col=8 len=5 mult=1.000000)
           FIELD(code=2 col=16 len=5 mult=1.000000)
           FIELD(code=2 col=24 len=5 mult=1.000000)
        }
     RECORD (min=15 max=10000000) {
           FIELD(code=7 col=2 len=9 mult=1.000000)
           FIELD(code=8 col=12 len=9 mult=1.000000)
           FIELD(code=8 col=22 len=9 mult=1.000000)
           FIELD(code=8 col=32 len=9 mult=1.000000)
        }
}
```

Exercise 5-4. Using Well Data Manager and WOW Software to Verify the Curve Load

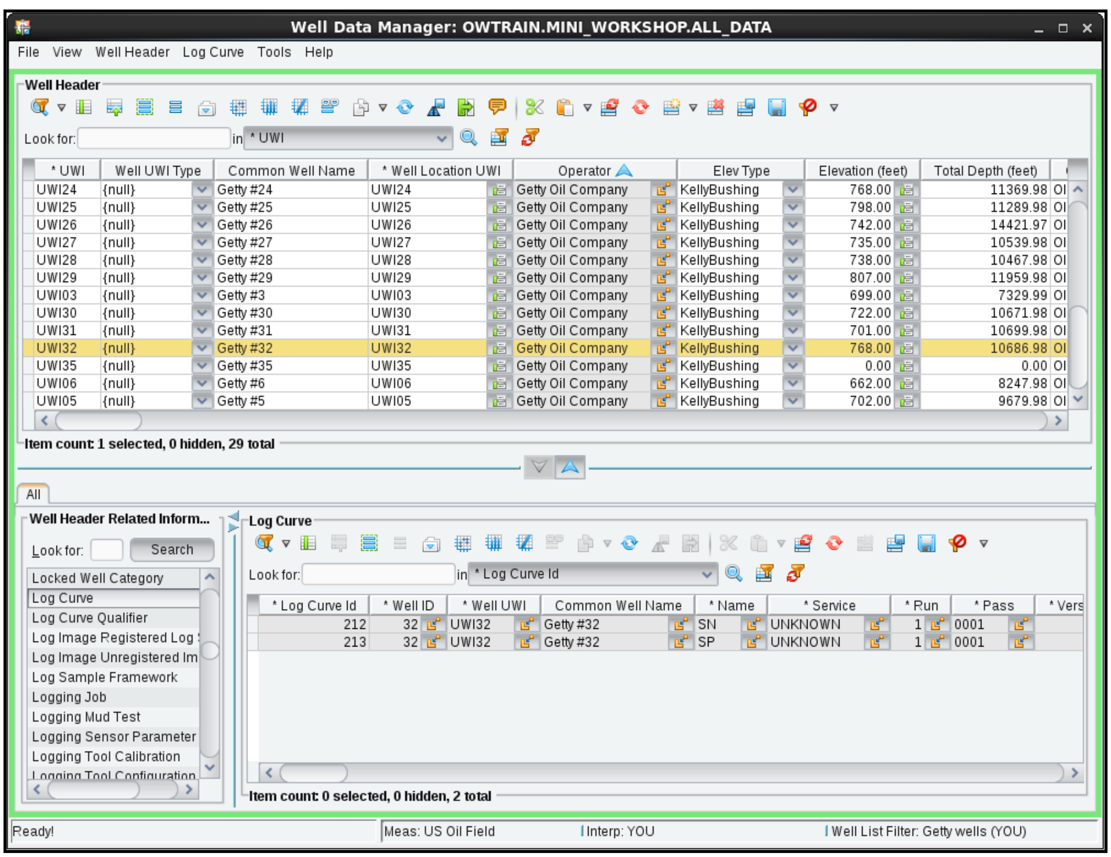
1. Initialize the Well Data Manager by selecting **Data > Management > Well Data Manager** from the OpenWorks command menu.

2. Click the **All Well Header** button at the bottom of the Well Header Filter dialog box.

3. Scroll down the list and select **Getty #32** (UWI32), the well you renamed from UWIBo in the previous exercise.

4. Scroll down the Well Header related information list to select the **Log Curve**.

> **Note**
>
> The form contains entries for two curves (SN and SP), indicating that the curves were loaded to the project.



5. Select **Getty #11** and **Getty #12** to verify that the other curves you selected also loaded to your project.

6. **File > Exit** the Well Data Manager.

7. Enter `http://<your machine name here>/` in the address line of your browser.

8. Click **OpenWorks** in the left pane of the WOW software main window.

9. Click **MINI_WORKSHOP** in the middle pane.

10. Click **36** next to Wells in the Main Data table.

11. Click **Re-select wells** in the list of `MINI_WORKSHOP` Wells that displays.

12. Click the With Curves checkbox and click **Go**.

13. Verify that curves were loaded by clicking each well in the list to see entries for curves in the Data Counts column on the right.

Loading Other Types of Curve Data

While well log curves are perhaps the most common type of curve data, they are not the only type. The OpenWorks Curve Loader is equipped to handle other types of curve data, including:

- Well log curves
- Position logs
- Angular directional surveys
- Synthetic seismograms
- Time depth tables

In the pages that follow, each type of curve data is briefly discussed, and a sample file of each type is displayed.

Beginning with the 2003.12.1.2 patch release the OpenWorks software introduced the first in a series of critical enhancements to directional survey handling that addressed important long standing issues. In R5000 these enhancements and other capabilities have been fully incorporated into the product.

The 2003.12.1.3 Enhancements included:

- Loading directional surveys and position logs relative to Grid north (where the map projection of the data is different from the project cartographic system).

- Correctly handling position logs and deviation data in projects with a latitude/longitude project cartographic system.

R5000 Enhancements in Directional Surveys and Position Logs Management

- Loading Directional Surveys and Position Logs relative to Grid north. (Where the map projection of the data is different from the project cartographic system.)
- In a latitude/longitude project position logs will be stored in offsets from the surface in degrees of “delta lat/long.”
- The ability to splice the up-hole portion of side track well’s position log from its parent well’s position log. If the relationship between the well and its parent well is not set up in the well header table, the tie point may be loaded explicitly.
- It is now possible to specify the parent well and kick-off point for a sidetrack while loading directional data. This allows the user to build the well network while loading directional data.
- The OpenWorks software now store original “as entered” data when users load position logs. This way if the system does any cartographic conversion or splicing the original data supplied by the user is preserved.
- Both Curve Loader and Well Data Manager now support specification of tie points for directional surveys.
- It is now possible to correct data loaded in position log format for true north. Previously true north correction was only possible when computing position logs from directional surveys.
- In R5000, all position log computation is done by the OpenWorks software in the loading data procedure by a common code.

In R5000 the basic logic for handling position logs and directional surveys remains the same as in previous releases, but the workflow has been enhanced to allow the option of splicing the up-hole section from the parent well for complex well systems.

Overview of Angular Directional Surveys

Angular directional surveys contain a series of dip and azimuth readings, usually taken at regularly spaced intervals down the wellbore.

- The input file must include the depth of measurement for each record.
- Each record must contain at least one value for **depth**, **dip** (also called *inclination* or *deviation*), and **azimuth** (also called *bearing* or *direction*).
- Multiple depths can display on the same data record.
- Directional data is always **Multiplexed**.
- The Curve Delimiter is always **Name**.
- The directional survey can be automatically converted into a position log for display (using one of five computational methods).
- Multiple directional surveys can be loaded for each well, but if you load a new directional survey and the option to generate position log is turned on, it will overwrite the previous position log for the well, as it can be only one position log per well at a time.

UNIX Window

```
Directional Survey
     Common Well Name       : G-11
     Number of Points       : 73
     Single/Multi Shot      : S

      Meas. Depth    Inclination      Azimuth
      ===========    ===========      =======
           100.00           0.25        15.00
           150.00           0.50       165.00
           200.00           0.25       339.00
           250.00           0.25       193.00
           300.00           0.50       275.00
           350.00           0.00       270.00
           400.00           0.50       209.00
           450.00           0.50       286.00
           500.00           0.25       345.00
           550.00           0.75       340.00
           600.00           1.25       336.00
           650.00           2.25       350.00
           953.00           1.25       285.00
          1092.00           0.25       270.00
          1153.00           1.75        60.00
          1213.00           3.25        55.00
          1300.00           4.75        40.00
          1400.00           6.50        48.00
          1518.00           8.00        50.00
          1642.00          10.75        48.00
          1766.00          11.50        48.00
```

Example of an Angular Directional Survey

In accordance with the enhancements to the deviation logic in this release, new fields can be loaded to the directional surveys. The screenshot below shows the fields that may now be loaded from directional surveys.

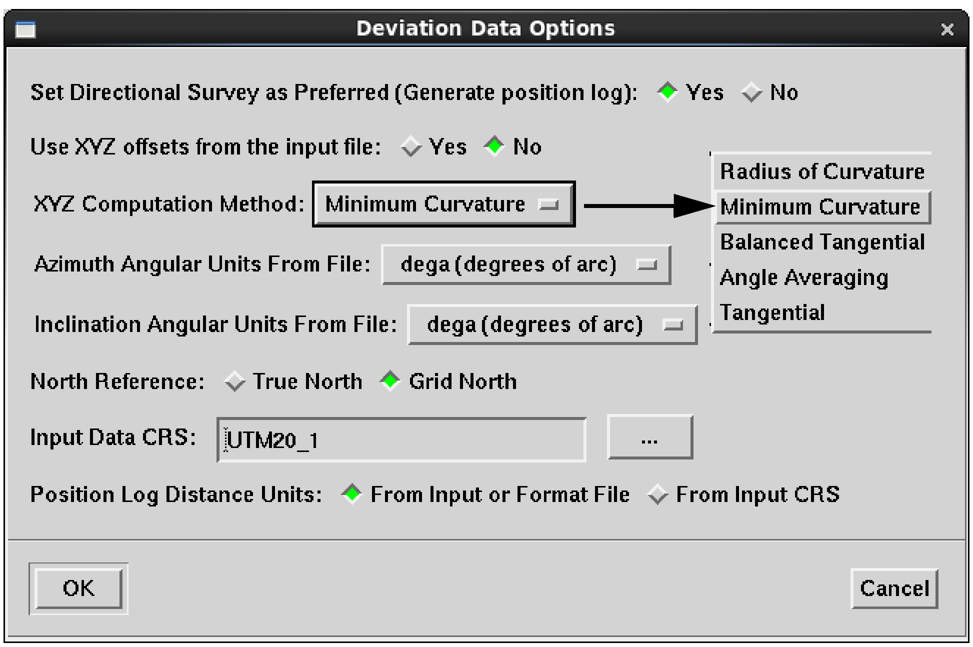
X and Y absolute and offsets are for storing the original values from the data.

Tie points: It is used for sidetracks, and it refers to the depth at which the wellbore sidetracks from its parent wellbore. Is not needed if the well has a parent well and a kick-off point is specified in its well_header record. But if the relationship between the well and its parent is not set up in the well header table, the tie point may be loaded explicitly.

> **Note**
>
> If survey data to be loaded extends all the way to the survey, no tie points or splicing will be needed.

Deviation Data Options

When you load deviation data you can select Position Log computation Method first. If you open **Curve Loader** > **Options** > **Deviation Data Options** you will see the options you have:



Set Directional Survey as Preferred (Generate Position Log)

If set to “Y” the system will consider it the primary directional survey for a well and will generate a position log from it.

If set to “N” TVD, x_offset and y_offset will still be computed and stored in the corresponding columns of the directional survey, but a position log will not be generated.

Use XYZ Offsets from the Input File

Set to “No” if the input file has only depth, inclination angle, and azimuth angle. Set to “Yes” to use values for X offset, TVD, and Y offset in the input file (similar to inserting a position log directly).

XYZ Computation Method

- **Radius of Curvature**: based on sets of angles measured at the top and bottom of the course length. These measurements are used to generate a curve that represents the wellbore path. Considered to be one of the more accurate directional survey methods.

- **Minimum Curvature**: based on sets of angles measured at the top and bottom of the course length, smoothed onto the wellbore curve by a ratio factor defined by the curvature of the wellbore. This method, like the radius of curvature method, is also recommended. This is the default.

- **Balanced Tangential**: based on inclination and direction angles at the top and bottom of the course length. This method yields a smoother curve than the tangential method.

- **Angle Averaging**: based on the angles measured at the top and bottom of the course length, with the simple average of the two.

- **Tangential**: based on the inclination and direction angles at the lower end of the course length. This is the least accurate directional survey method. The advantage of this method is that calculations may be done by hand.

Azimuth Angular Units from File

The angular units in a directional survey can be one of several units (cycle, degrees of arc, gons, gradients, minutes angular, radians, and second angular), you should indicate the type of angular units the data uses.

Inclination Angular Units from File

The angular units in a directional survey can be one of several units (cycle, degrees of arc, gons, gradients, minutes angular, radians, and second angular), you should indicate the type of angular units the data uses.

Directional Survey Reference

Directional Survey Reference may either be *Grid North* or *True North*.

For *Grid North* a CRS ID should be provided to identify the CRS of the data (if no CRS is provided it will take the project CRS). If CRS is different a cartographic conversion will be performed. This conversion will provide offsets from the well surface location in grid north relative to the project CRS. It also scales the data to match the local scale factor of the project CRS.

For *True North*, no CRS ID is required. The true north corrections assume that input azimuth data is relative to true north and that x,y offsets are in absolute distance with no stretch or squeeze relative to the scale factor of the cartographic system. It corrects the position log to be relative to grid north in the project CRS and adjust the offset to reflect the scale factor of the project CRS.

Input Data CRS

Set the Input Data CRS if *Grid North* was selected.

Position Log Distance Units

For specifying the distance units of the position log, it can be specified either by the input/format file or from the input CRS.

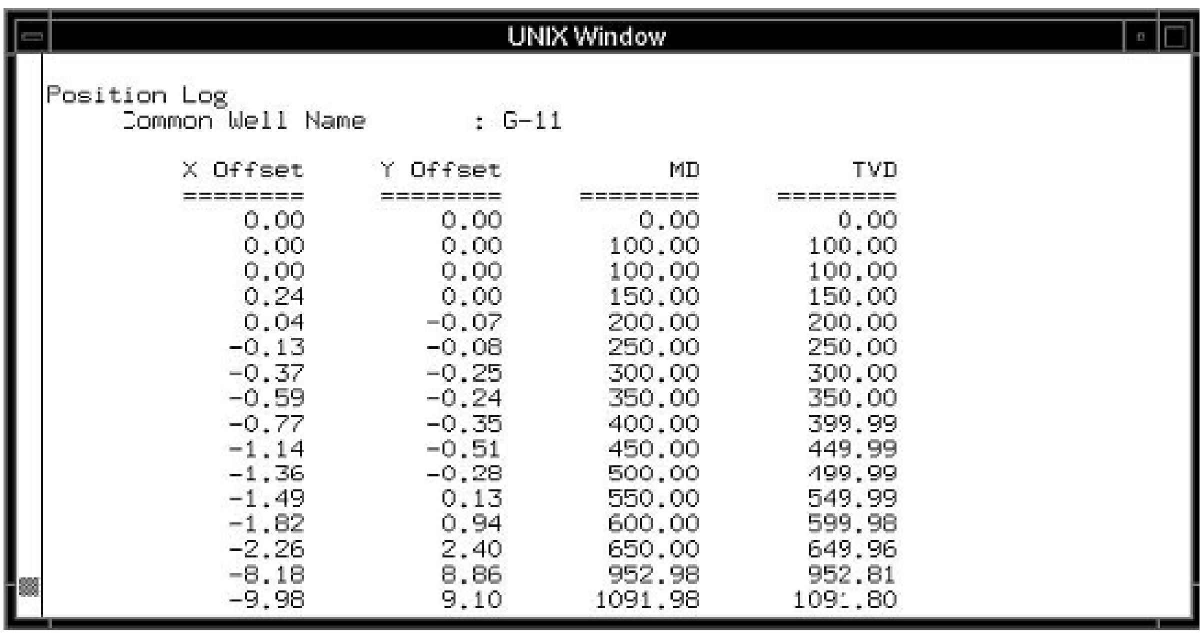
Notes

- The well location data must be loaded before loading the directional data because the correction is dependant on surface location.
- Minimum Curvature is the default computation method for Deviation Data.

Overview of Position Logs

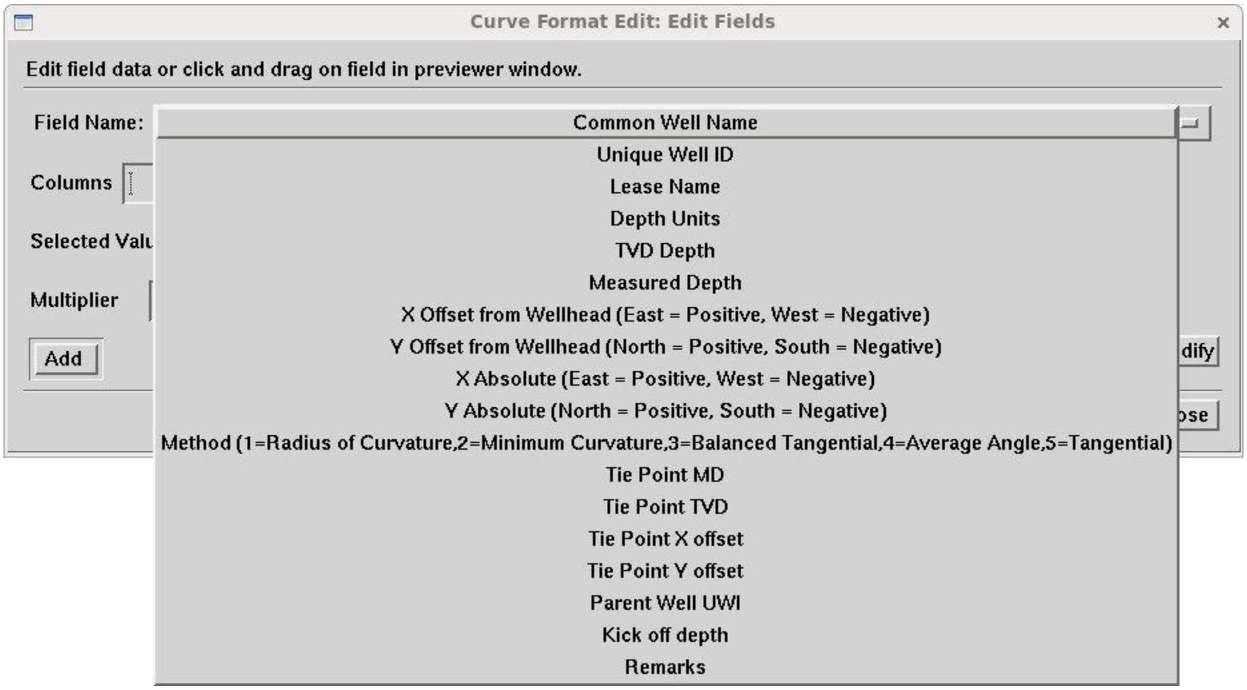
Position logs are an alternative to directional surveys. They contain either calculated offsets along the x and y axes for the wellbore at successive depth points, or absolute values for x and y.

- Each record contains at least one value for depth, x-offset, and y-offset. If you format your position log data as MD, you must also format a TVD.
- If you format your position log data as MD, you must also format a TVD.
- Multiple depth points can occur on the same record.
- The number of depth, x values and y values on a record must be the same on each record.
- Position log data is always **Multiplexed**, and the Curve Delimiter is always **Name**.
- Only one position log is allowed for each well.


UNIX Window

```
Position Log
     Common Well Name       : G-11

         X Offset     Y Offset          MD         TVD
         ========     ========    ========    ========
             0.00         0.00        0.00        0.00
             0.00         0.00      100.00      100.00
             0.00         0.00      100.00      100.00
             0.24         0.00      150.00      150.00
             0.04        -0.07      200.00      200.00
            -0.13        -0.08      250.00      250.00
            -0.37        -0.25      300.00      300.00
            -0.59        -0.24      350.00      350.00
            -0.77        -0.35      400.00      399.99
            -1.14        -0.51      450.00      449.99
            -1.36        -0.28      500.00      499.99
            -1.49         0.13      550.00      549.99
            -1.82         0.94      600.00      599.98
            -2.26         2.40      650.00      649.96
            -8.18         8.86      952.98      952.81
            -9.98         9.10     1091.98     1091.80
```

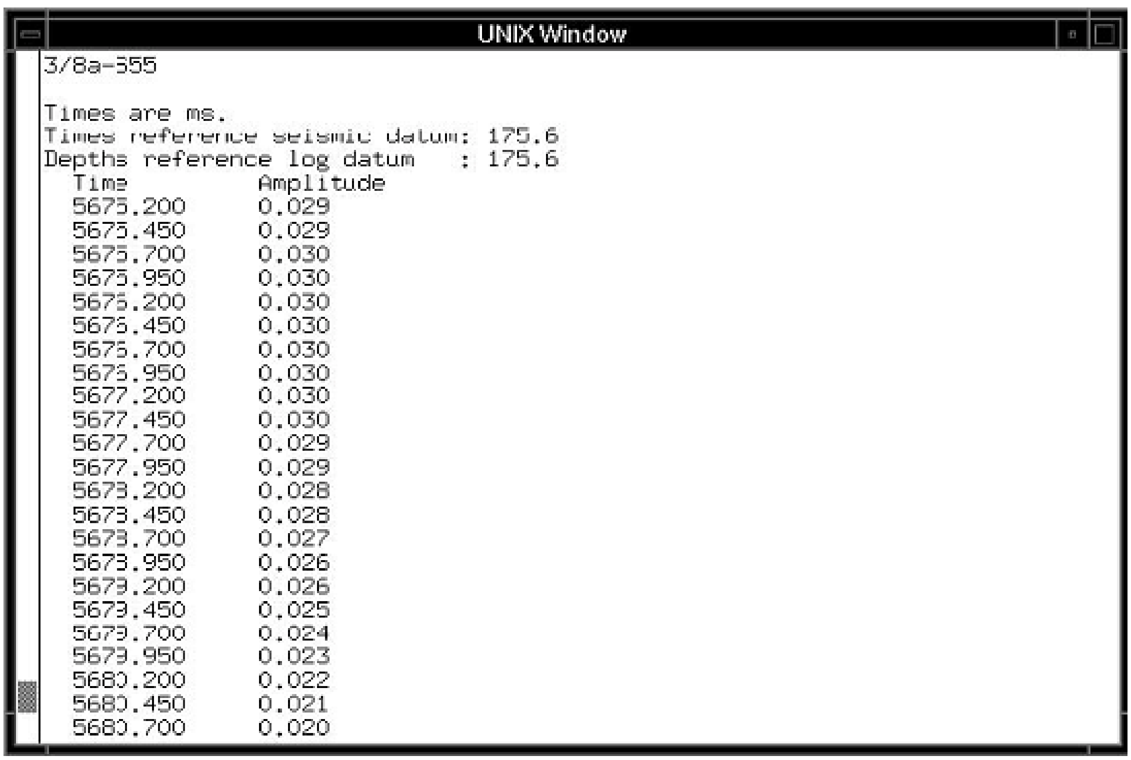
In accordance with enhancements to the deviation logic in this release, new fields can be loaded to position logs. The screenshot below shows the fields that may now be loaded for position logs.



Overview of Synthetic Seismograms

Synthetic Seismograms are artificial seismic traces, typically generated from density and sonic logs, and used to calibrate seismic surveys to well log curves and vice-versa.

- Synthetic seismograms can be in **Multiplexed** or **Serial** format.
- Only one travel time value can display on a record. However, several amplitudes can display on a record.
- Synthetics can have either an explicit time curve or a start time, end time, and interval.
- Synthetics must be evenly sampled.
- The synthetic name is unique for a given well and a given model name.


UNIX Window

```
3/8a-555

Times are ms.
Times reference seismic datum: 175.6
Depths reference log datum   : 175.6
  Time         Amplitude
  5675.200     0.029
  5675.450     0.029
  5675.700     0.030
  5675.950     0.030
  5676.200     0.030
  5676.450     0.030
  5676.700     0.030
  5676.950     0.030
  5677.200     0.030
  5677.450     0.030
  5677.700     0.029
  5677.950     0.029
  5678.200     0.028
  5678.450     0.028
  5678.700     0.027
  5678.950     0.026
  5679.200     0.026
  5679.450     0.025
  5679.700     0.024
  5679.950     0.023
  5680.200     0.022
  5680.450     0.021
  5680.700     0.020
```

Overview of Time-Depth Tables

Time-depth tables relate seismic two-way travel time in seconds to *true vertical depth* in a wellbore.

- Time-depth tables must have a unique name, and must be attached to a particular well.
- Time-depth tables are always **Serial**.
- You must have an elevation type and datum defined before you can load time-depth data.

UNIX Window

```
Time Depth
     Common Well Name       : P.GABRIEL
     Time Depth Name        : WLDATA
     Shift Value            : -43.0000
     Datum                  : 0.0000
     Data Source            : OW2
     Checkshot Flag         : 0
     Sample Count           : 26

            Depth            Time
            =====            ====
             0.00            0.00
           408.00          149.00
          1908.00          694.00
          2408.00          855.00
          2908.00          998.00
          3408.00         1133.00
          3908.00         1265.00
          4408.00         1398.00
          4908.00         1526.00
          5408.00         1646.00
          5908.00         1762.00
          6405.00         1883.00
          6007.00         1995.00
          7349.00         2107.00
          7735.00         2207.00
          7904.00         2254.00
          7967.00         2271.00
```

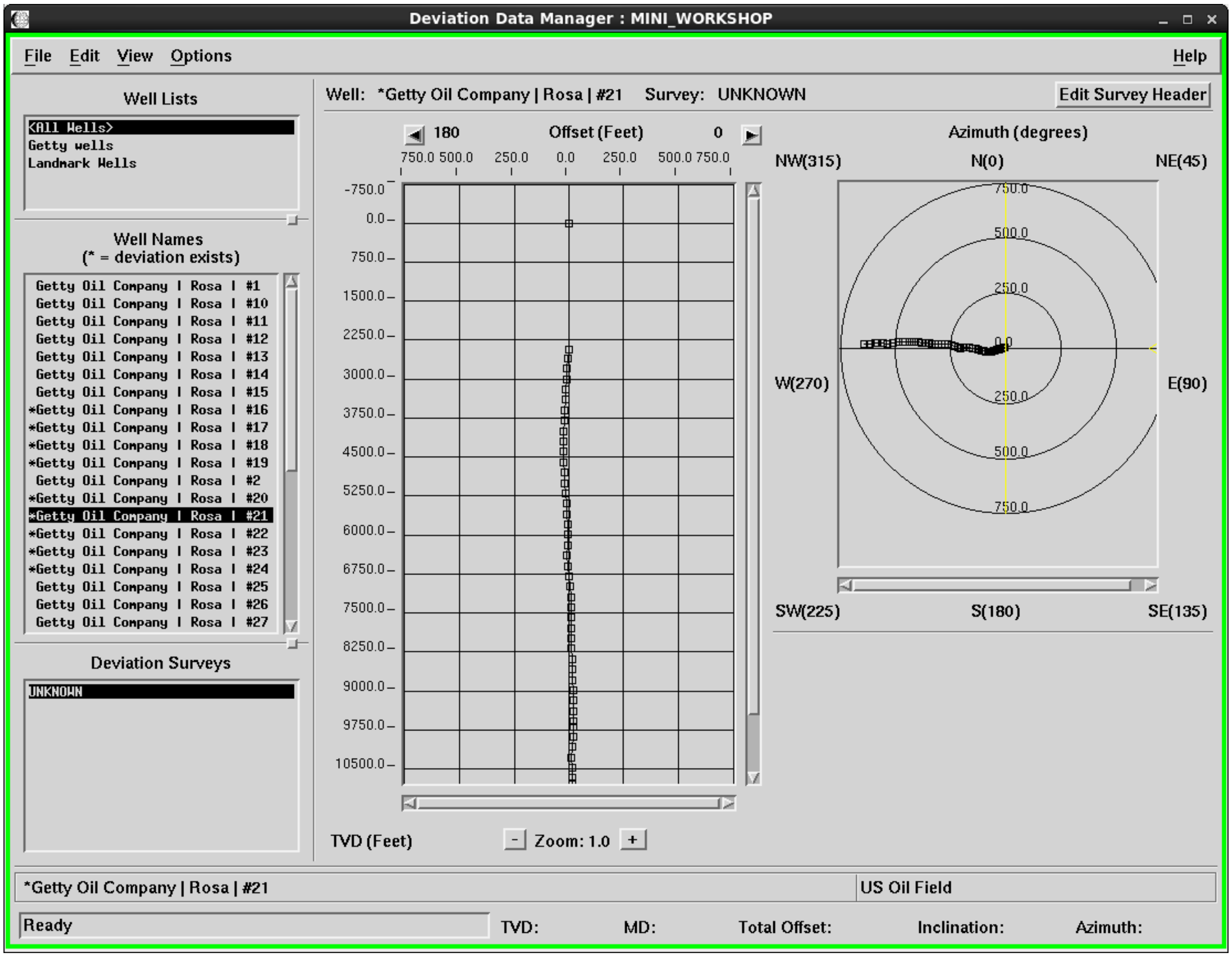
Deviation Data Manager: An Introduction

The Deviation Data Manager displays deviation (or directional) data graphically and allows you to:

- View deviation (or directional) surveys in profile and from above (offset and azimuth views)
- Edit or delete data points on deviation surveys
- Generate position logs from deviation surveys
- Delete deviation surveys

Deviation surveys are displayed in offset profile and in azimuth view; each square on the curve represents a data point. If the well has multiple deviation surveys, you can display several or all of them simultaneously.

The active survey is shown in black.



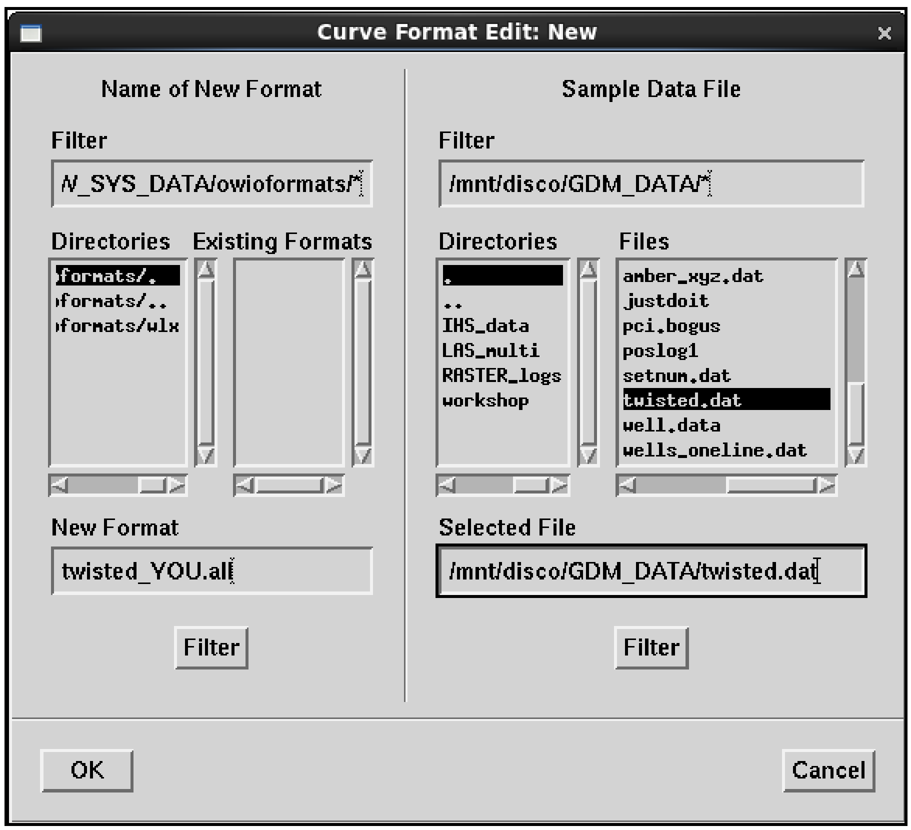
Exercise 5-5. Loading Directional Survey Data Using Curve Loader

This exercise shows how to format and load directional survey data using the curve loader.

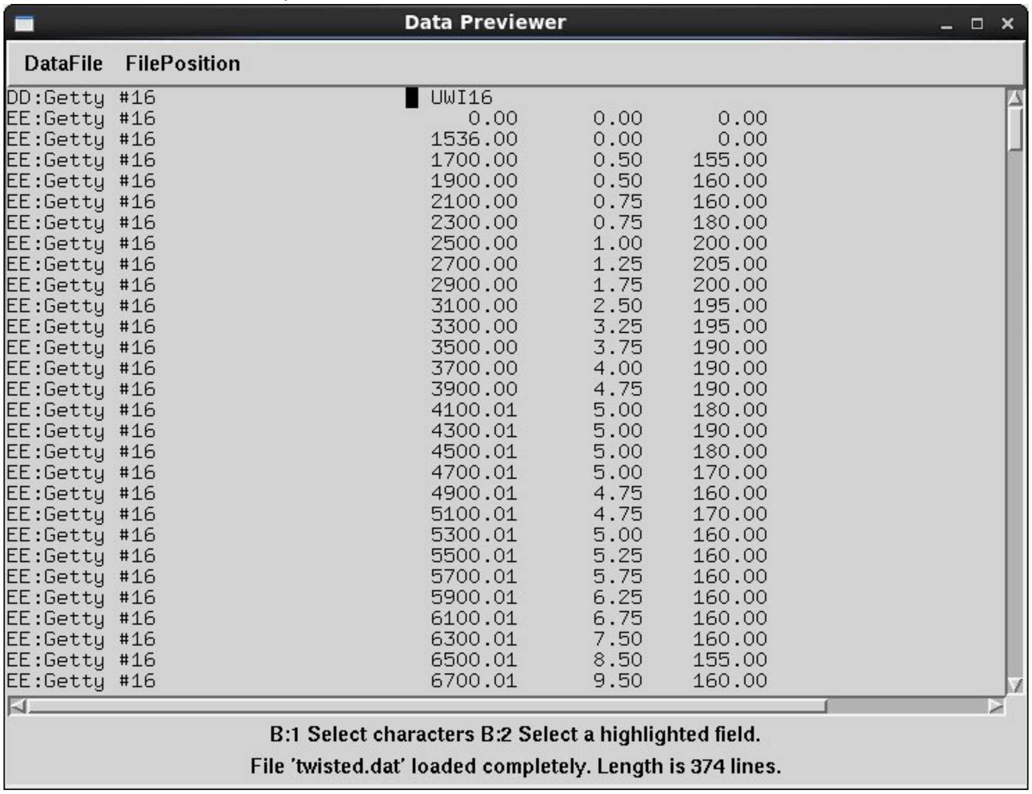
1. Select **Edit > ASCII Format** from the Curve Loader menu.

2. Select **Format > New** from the Curve Format Edit dialog box.

3. Use the filter to select the data file **twisted.dat** in the Curve Format Edit dialog box. Name the new format **twisted_YOU.all**, and select **OK**.



4. Examine the data file with the **FilePosition** options to determine how many wells and curves are in the file.



5. Select the parameter **Record ID Type** in the Format Parameters section of the Curve Edit Format window then press the **Modify** button. Select **Marker**. Use the cursor in the Data Previewer window to select the marker location (columns 1 - 3) or type in the column numbers. Press **OK**.

6. Select **Well Delimiter** in the Format Parameters window and select **Modify**. Set the Well Delimiter to **Beginning of Well Marker**, and highlight **DD:** in line 1. This character string uniquely identifies the beginning of a new well. Press **OK**.

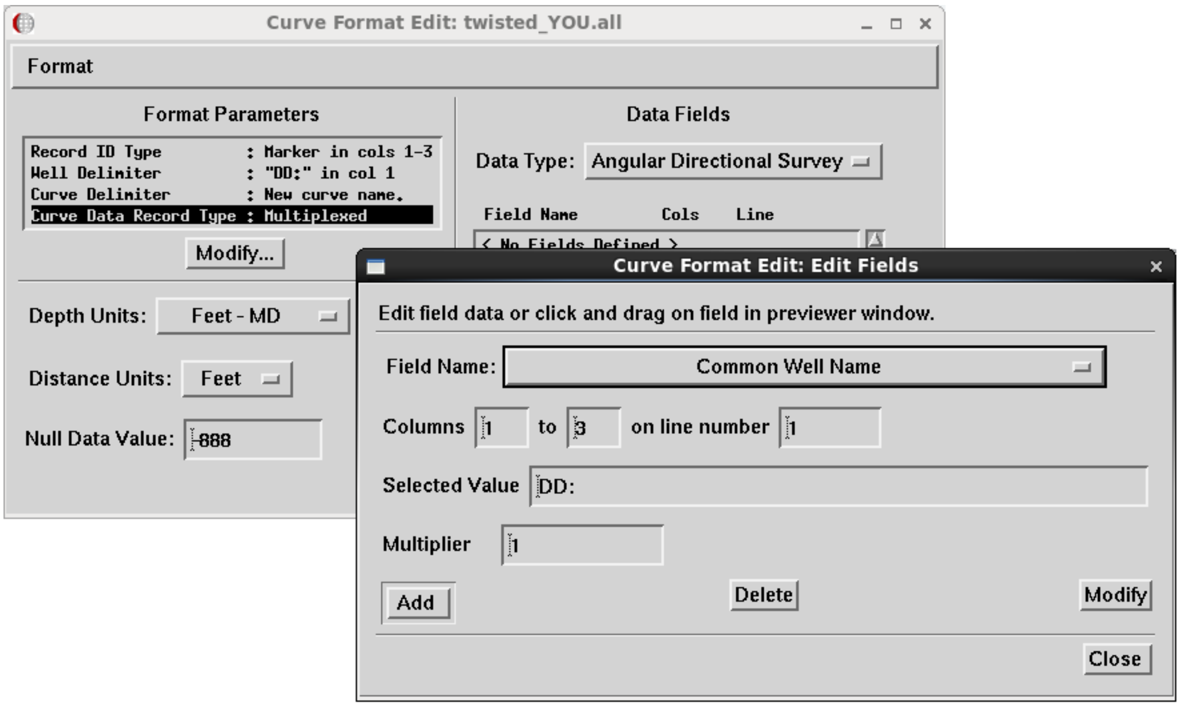
7. Select **Curve Delimiter** in the Format Parameters window and select **Modify**. Set the Curve Delimiter to **Name**. Press **OK**.

8. Select **Curve Data Record Type** in the Format Parameters window and select **Modify**. Select **Multiplexed**. Press **OK**.

9. Set the **Depth Units** to **Feet - MD** and the **Distance Units** to **Feet**.

10. The **Null Data Value** should be set to **-888**.

11. Select the data type **Angular Directional Survey**, and click the **Edit** button.

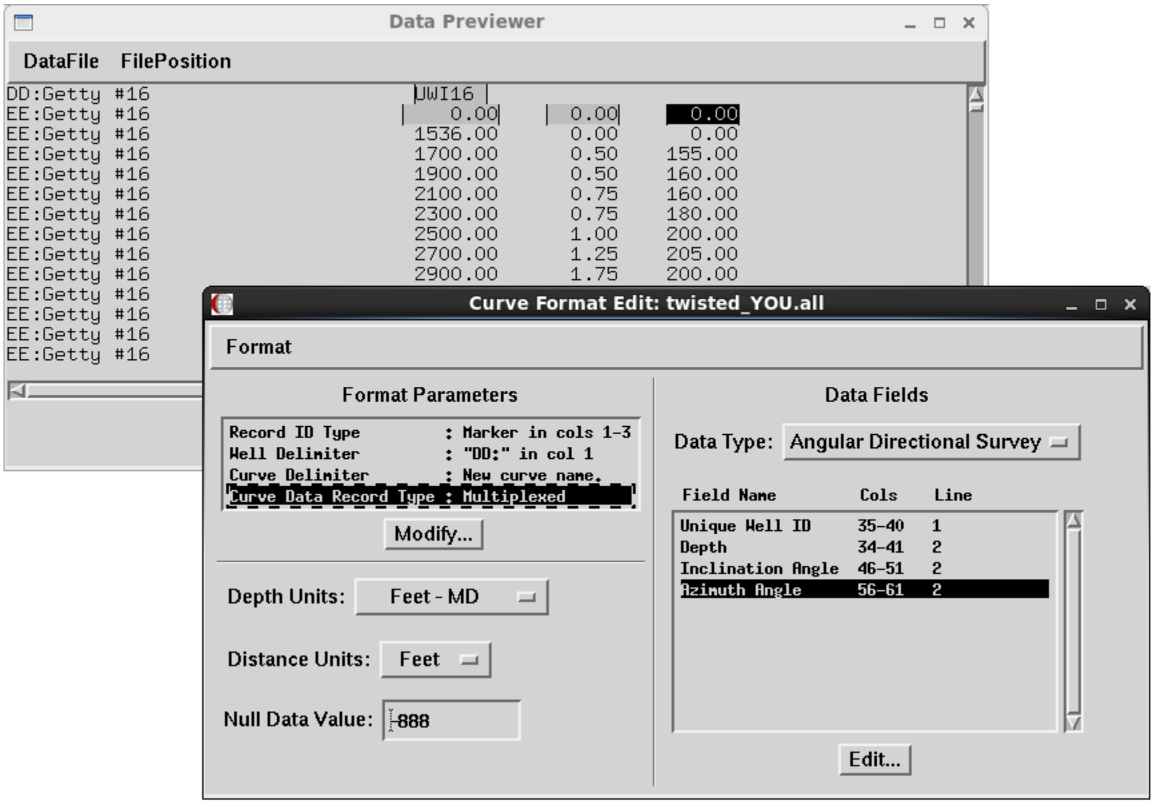


12. Format the following fields:

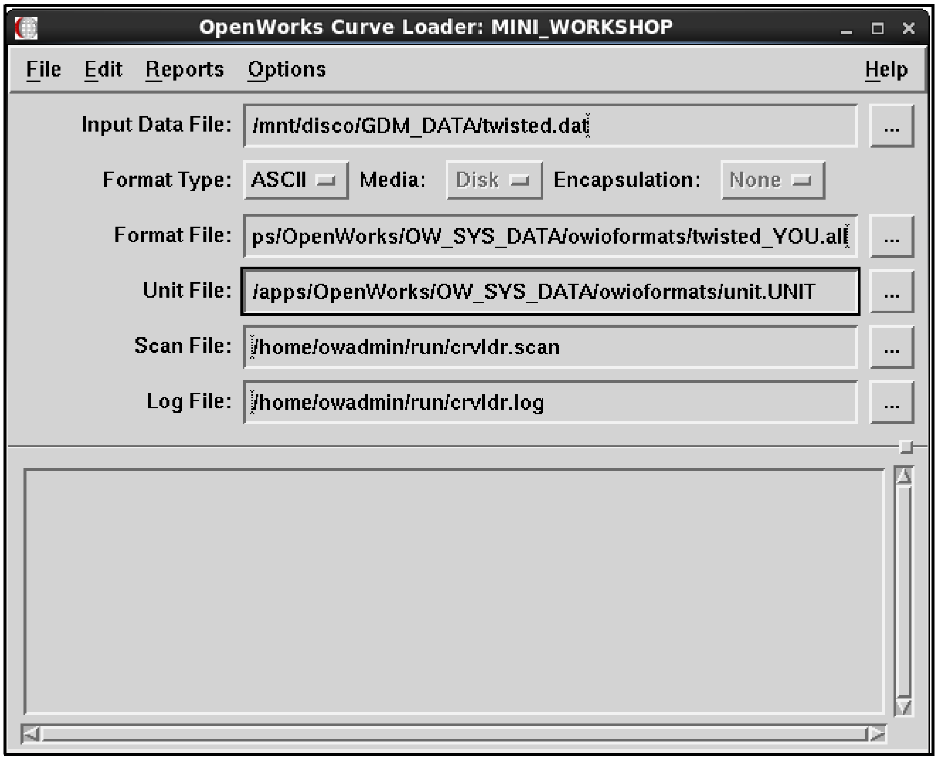
Field Name	Columns	Line
Unique Well ID	35 to 40	1
Depth of Measurement	34 to 41	2
Inclination Angle	46 to 51	2
Azimuth Angle	56 to 61	2

13. Close the **Edit Fields** dialog box, and save your format with **Format > Save (Needed)** from the Curve Format Edit window.

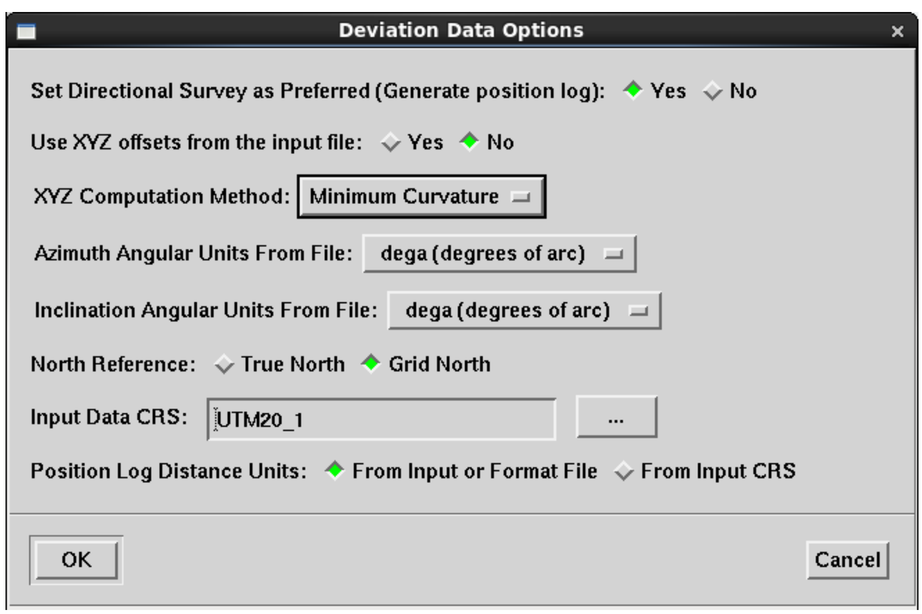
    Your display should now look like the image shown here.



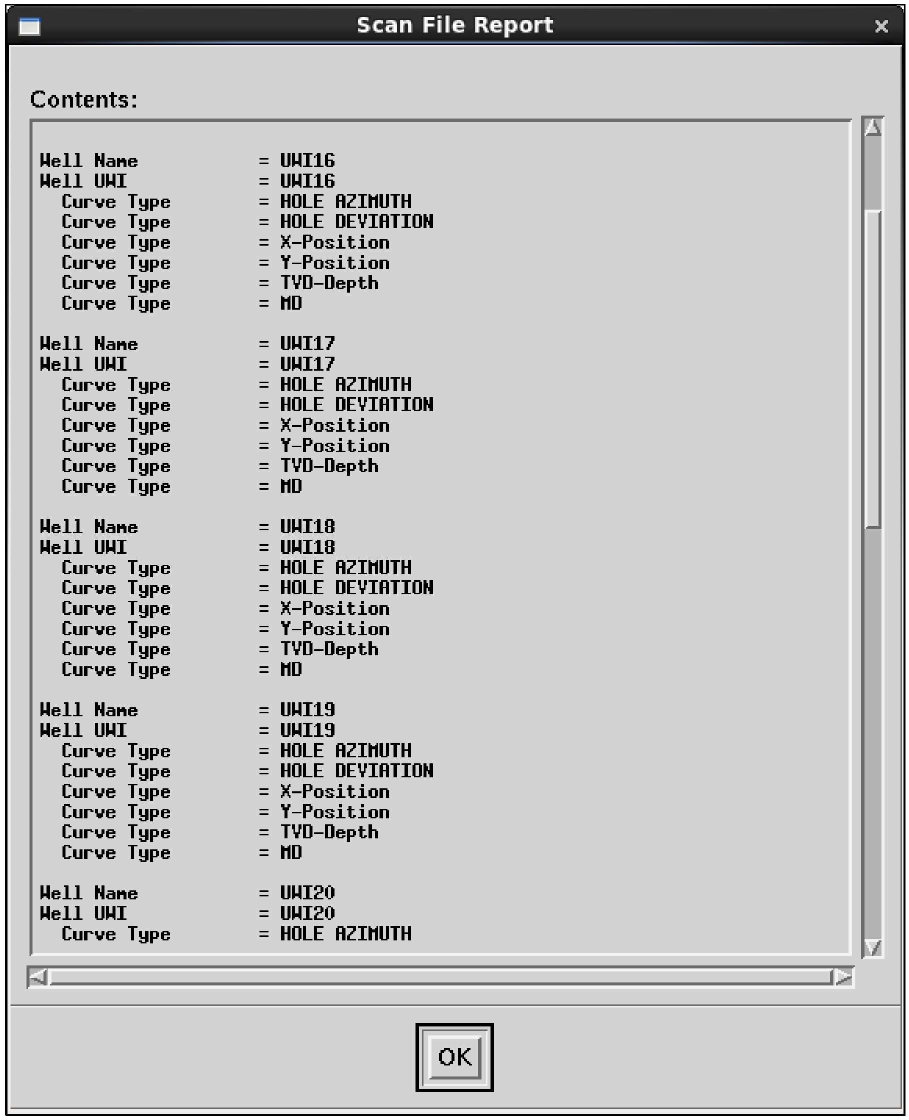
14. In the Curve Loader window, select **`twisted.dat`** as the Input Data File, set the Format Type to **ASCII**, and select the format file you just created and saved. Accept the defaults for **Unit File**, **Scan File**, and **Log File**.



15. Go to **Options > Deviation Data Options** to see various options for creating a position log for the directional survey data. Make sure that **Use XYZ from the input file:** is set to **No** (the default). Allow the other parameters to default for this exercise.



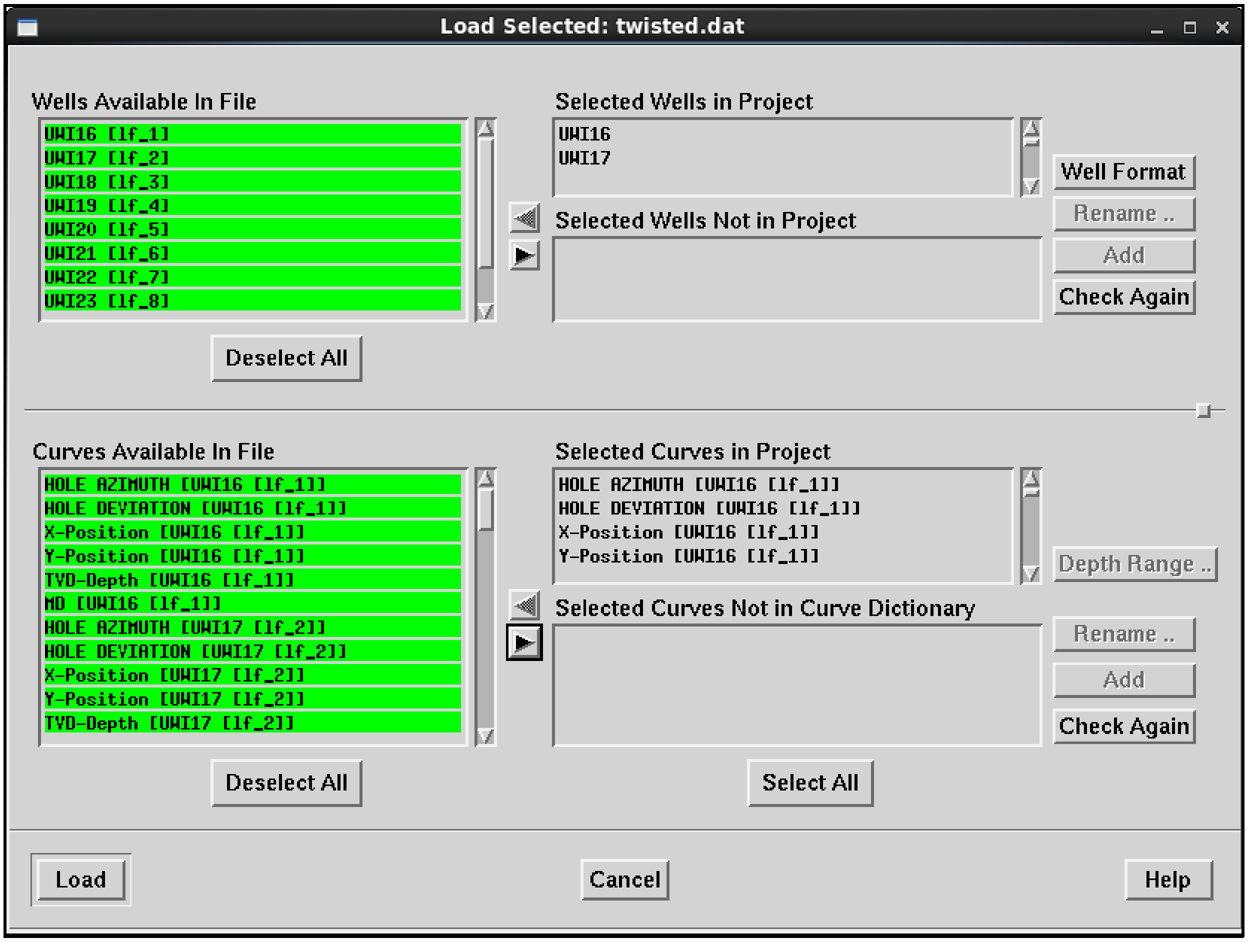
16. Select **File > Scan** from the Curve Loader window. Click **Close** to dismiss the Scan dialog box. The scanned data displays in the bottom half of the window, and in the Scan File Report (select **Reports > Scan Report**).



17. Use the Load Select option to load your data:

- Select **File > Load Select** from the Curve Loader menu.
- Click the **Select All** button under **Wells Available In File**.
- Click the arrow to move these wells from the *available* to the *selected* side of the Load Selected dialog box.
- Click the **Select All** button under Curves Available In File.

- Click the arrow to move these curves from the *available* to the *selected* side of the Load Selected dialog box.



18. Select **Load** in the Load Selected window.

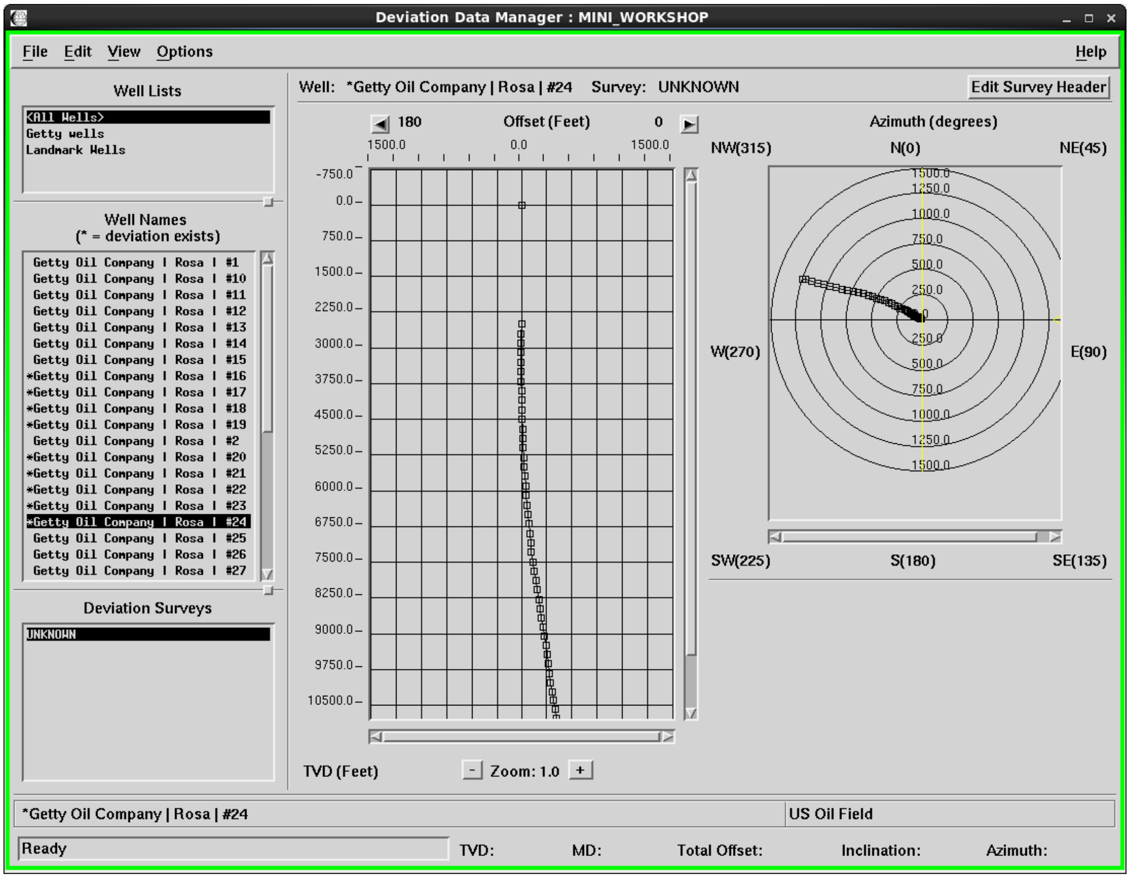
> **Note**
>
> If you are prompted to update X/Y coordinates, select **Update None and Continue**.

19. When the load is complete, click the **Close** button on the final message. Click **Close** to close the Load Selected window.

20. Open the Data Deviation Manager by selecting **Data >Management > Deviation Data Manager**.

21. Select **<All Wells>** under Well List. Scroll through the list of Well Names and notice that the wells with deviation surveys are denoted with an asterisk (*).

22. Select one of these wells. They are displayed in profile and azimuth view.



23. Compare deviation manager with WOW software.

- Type: **`http://<your machine name here>/`** into the address line of you browser.
- Click **OpenWorks** in the left pane of the WOW software main window.
- Click **MINI_WORKSHOP** in the middle pane.
- Click **36** next to Wells in the Main Data table.
- Click **Re-select wells** in the list of **MINI_WORKSHOP** Wells that displays.
- Click the **With Dir Surveys** checkbox and then click **Go**.
- Click **Getty #16** and click **1** next to Dir Surveys.
- Click **View next Dir Surveys**.
- After examining the data, click the **Back** button
- Click the arrow in the View column in the **Posn Logs** section.

24. When you are done observing your deviation surveys, Exit the Deviation Data Manager.

Exercise 5-6. Loading Directional Survey Data Using Data Import

This exercise shows how to format and load directional survey data using Data Import utility.

1. Make sure that **MINI_WORKSHOP** is still selected. If not, use **Project > Project Status**.

2. Return to the Data Type tab of Data Import or Launch it using **Data > Import > Data Import**.

3. Set the **Import Data Type** to **Wells** and browse to the folder that contains your data. Select the **twisted.dat** file. Select **Interactively define a new format for wells** and click **Continue**.

4. Examine the data file to determine how many wells and curves are in the file.

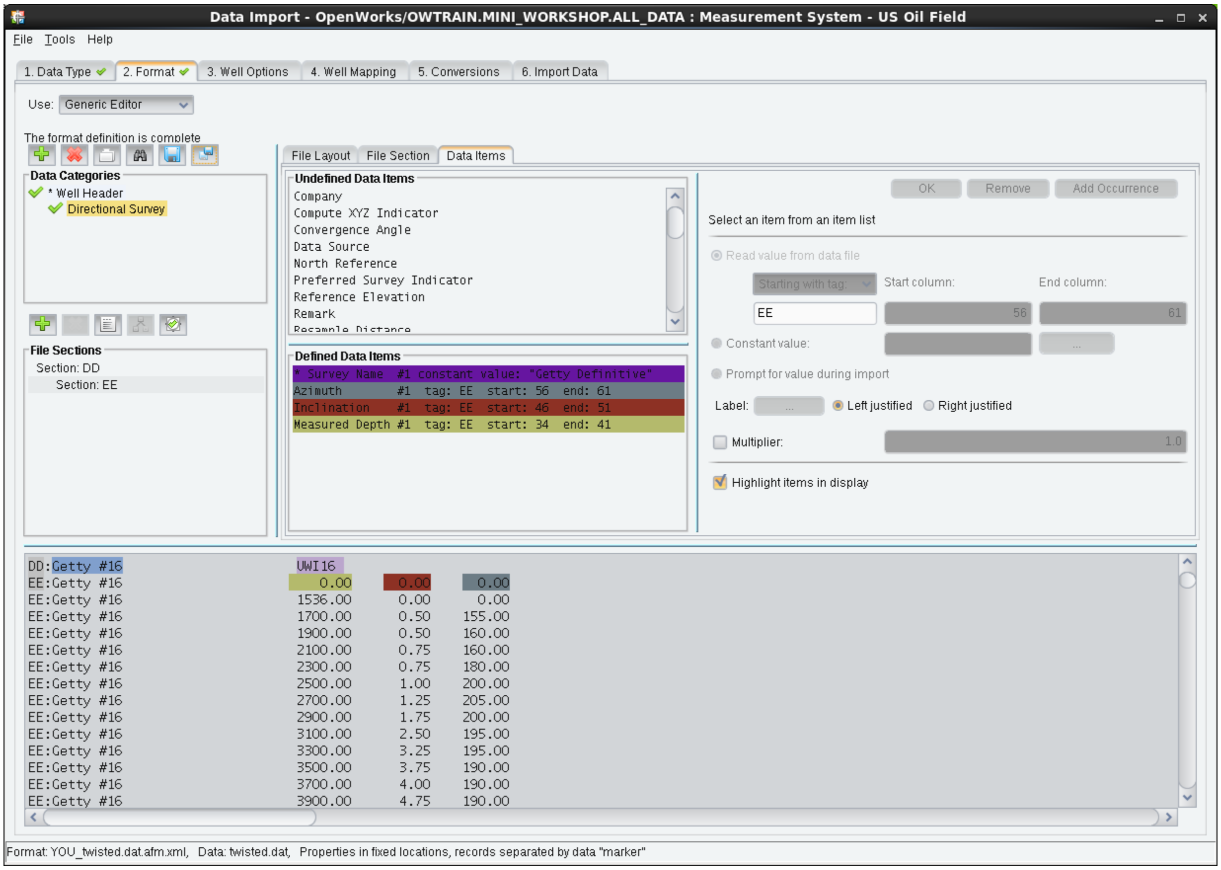
5. Format the following fields:

File Selection
DD
EE

Category	Field Name	Starting with tag	Columns
Well Header	*UWI	DD	35 to 40
	Common Well Name	DD	4 to 12
Directional Survey	*Survey Name	Constant Value = “Getty Definitive”	
	Measured Depth	EE	34 to 41
	Inclination	EE	46 to 51
	Azimuth	EE	56 to 61

6. Click the **Save as** icon and name the format file **YOU_twisted.dat.afm.xml**.

Your display should now look like the following:



7. Proceed to the Well Options tab. The lower portions of the tab includes options for how Directional Surveys and Position logs are handled. Keep the default options.

8. In the Well Mapping tab, click the **Scan Input data file** button. All of the wells in the file should already exist in the project. Keep the default settings and proceed to conversion.

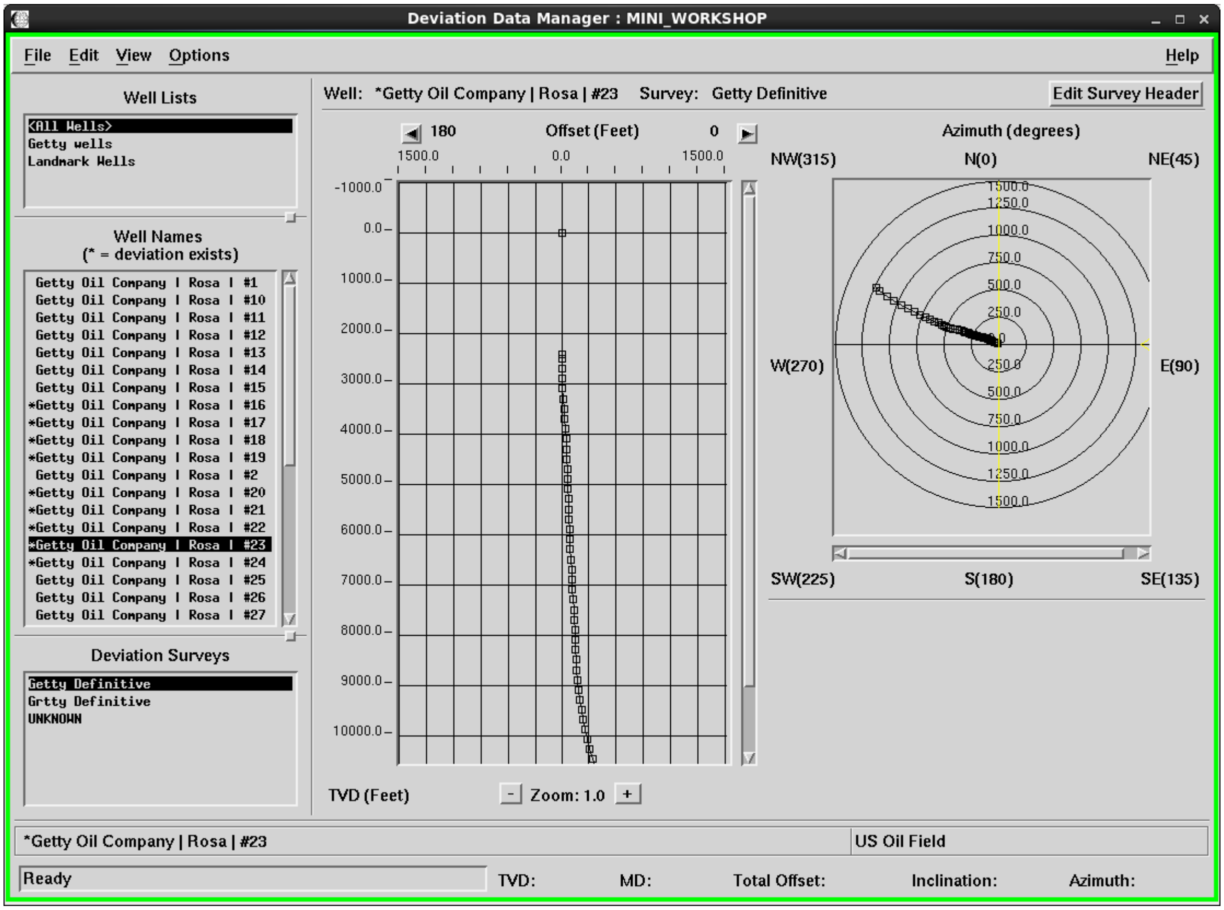
9. Keep the default settings in the Conversions tab and proceed to the Import Data tab.

10. Click the **Run** icon in the Import Data tab.

11. Open the Data Deviation Manager by selection **Data > Management > Deviation Data Manager**.

12. Select <**All Wells**> under Well List. Scroll through the list of Well Names and notice that the wells with deviation surveys are denoted with an asterisk (*).

13. Select one of these wells. They are displayed in Profile and Azimuth view.



14. Compare deviation manager with WOW software.

   - Type: **`http://<your machine name here>/`** into the address line of you browser.
   - Click **OpenWorks** in the left pane of the WOW software main window.
   - Click **MINI_WORKSHOP** in the middle pane.
   - Click **36** next to Wells in the Main Data table.
   - Click **Re-select wells** in the list of `MINI_WORKSHOP` Wells that displays.
   - Click the **With Dir Surveys** checkbox and then click **Go**.
   - Click **Getty #16** and click **1** next to Dir Surveys.
   - Click **View next Dir Surveys**.
   - After examining the data, click the **Back** button
   - Click the arrow in the **View** column in the **Posn Logs** section.

15. When you are done observing your deviation surveys, exit the Deviation Data Manager.

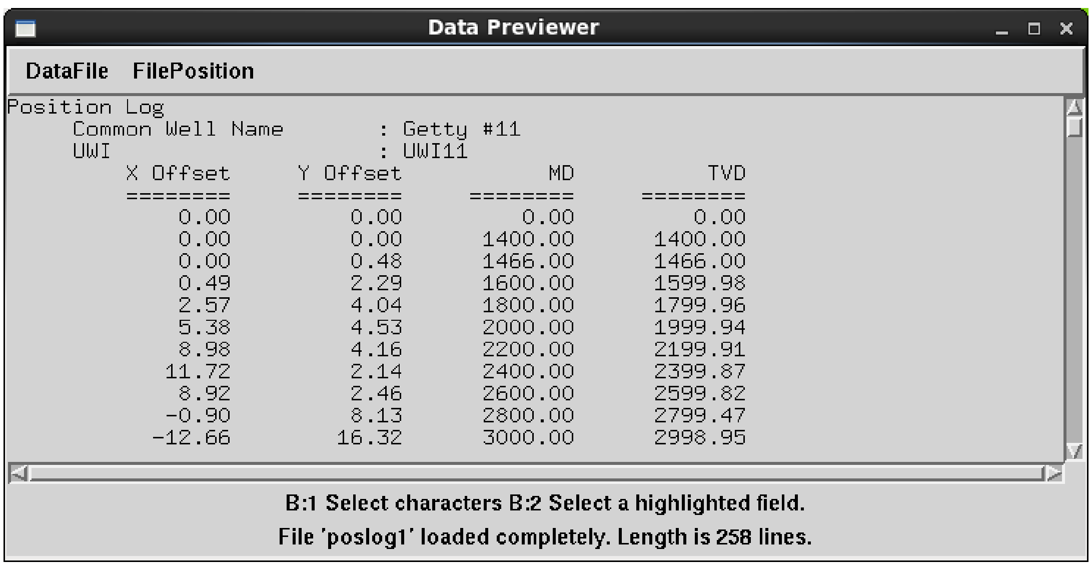
Exercise 5-7. Loading Position Logs

In this exercise you format and load position logs, create well instances, and add the curves to the Curve Dictionary.

1. Select **Format > New** from the Curve Format Edit dialog box.

2. Use the Filter to select the poslog1 data file in the Curve Format Edit dialog box. Name the new format **poslog1_YOU.all**, and click **OK**. Make sure you save your format to the **OW_SYS_DATA/owioformats** directory.

3. Examine the data file in the Data Previewer. Use the **FilePosition** options to determine its organizational structure.



4. Select the parameter **Record ID Type** in the Format Parameters section of the Curve Edit Format window, then press the **Modify** button. Select **Count**. Click **OK**.

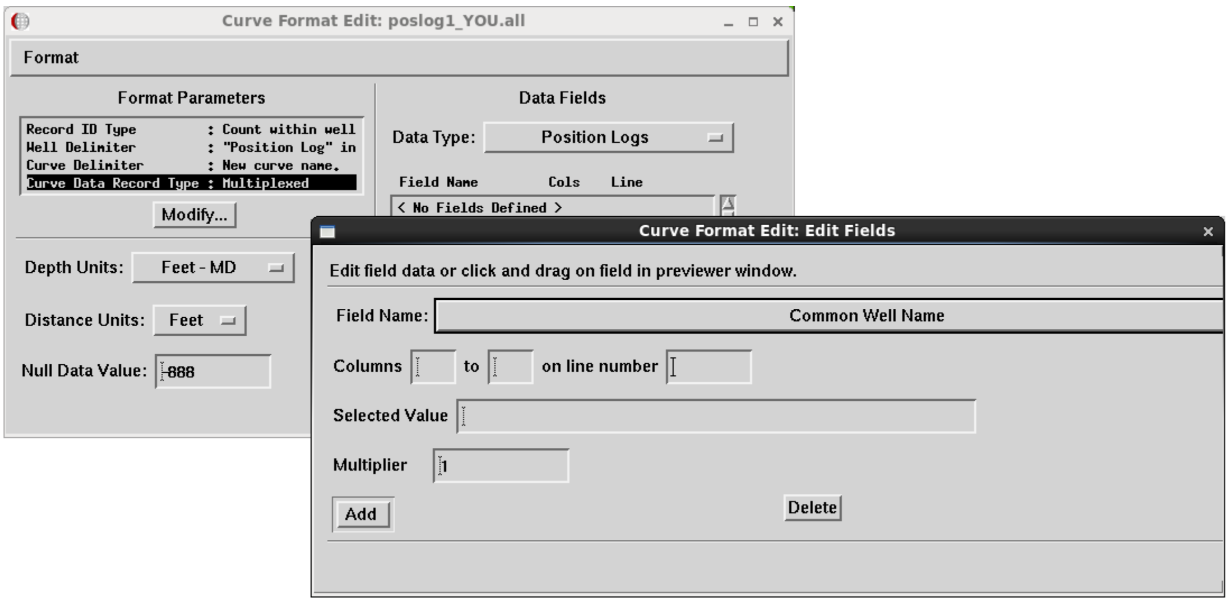
5. Select **Well Delimiter** in the Format Parameters window and select **Modify.** Set the Well Delimiter to **Beginning of Well Marker** and highlight **Position Log** in columns **1-12** on line **1**. Click **OK**.

6. Select **Curve Delimiter** in the Format Parameters window and select **Modify**. Set the Curve Delimiter to **Name**. Click **OK**.

7. Select **Curve Data Record Type** in the Format Parameters window and select **Modify**. Select **Multiplexed**. Click **OK**.

8. Set **Depth Units** to **Feet - MD** and **Distance Units** to **Feet**.

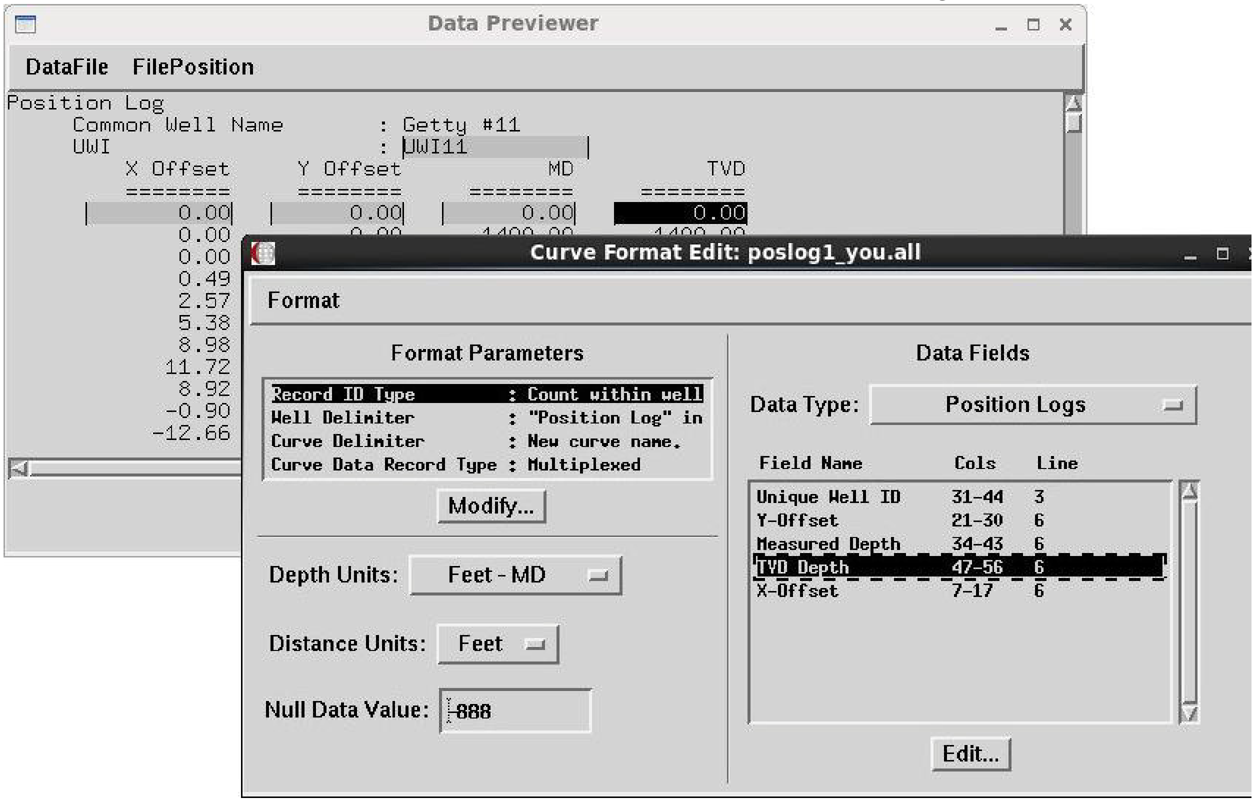
9. Select the data type **Position Logs**, and click the **Edit** button.



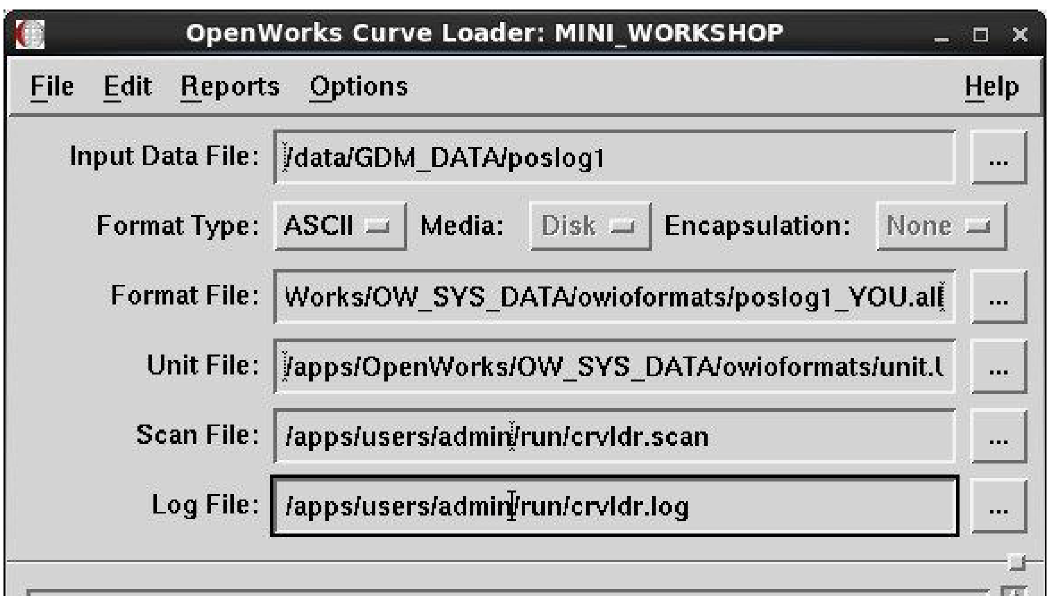
10. Format the following fields:

Field Name	Columns	Line
Unique Well ID	31 to 44	3
X-Offset from Wellhead	7 to 17	6
Y-Offset from Wellhead	21 to 30	6
Measured Depth	34 to 43	6
TVD Depth	47 to 56	6

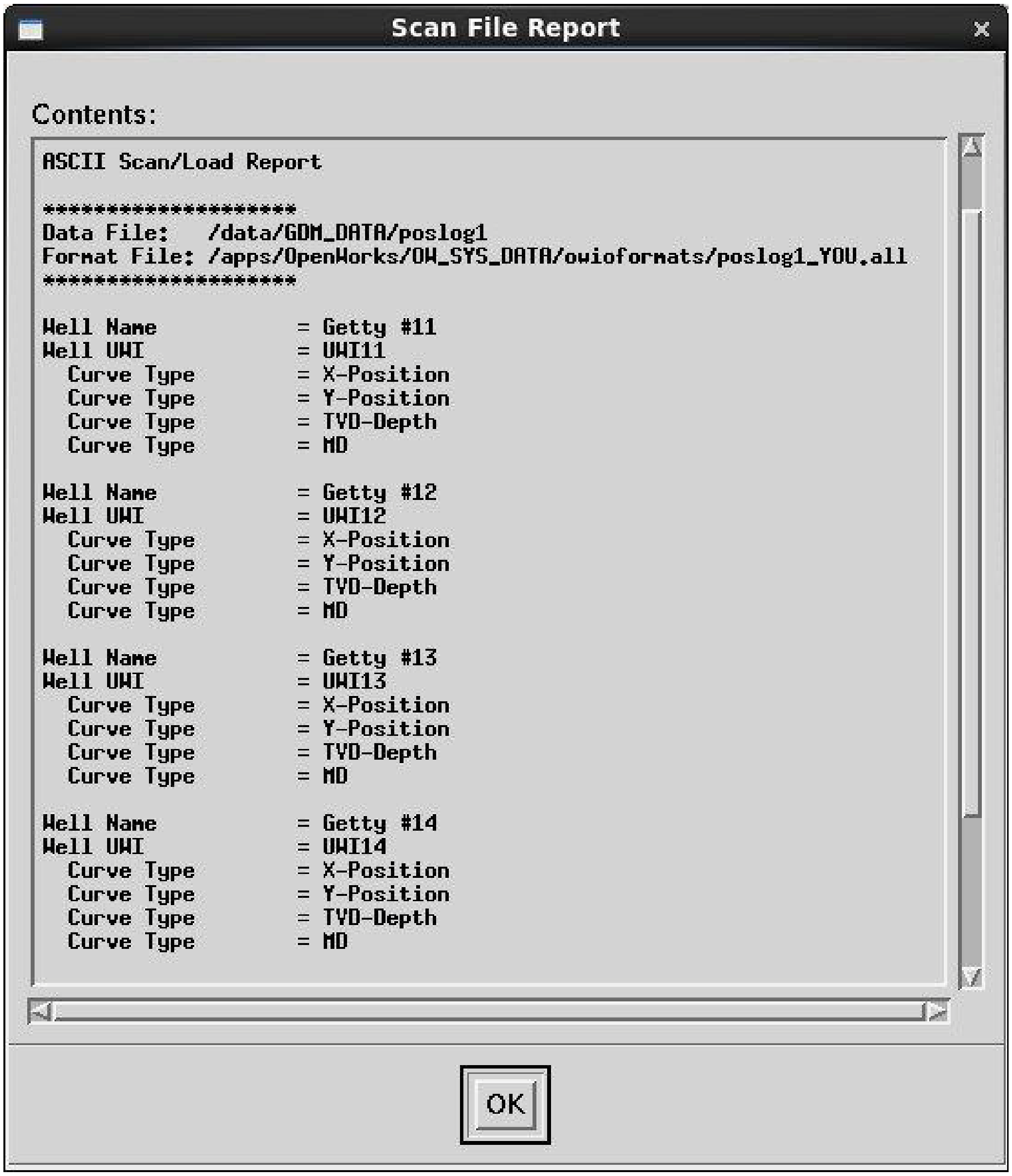
11. Close the Edit Fields dialog box, and save your format with **Format > Save (Needed)** from the Curve Format Edit window. Your screens should now resemble the image below:



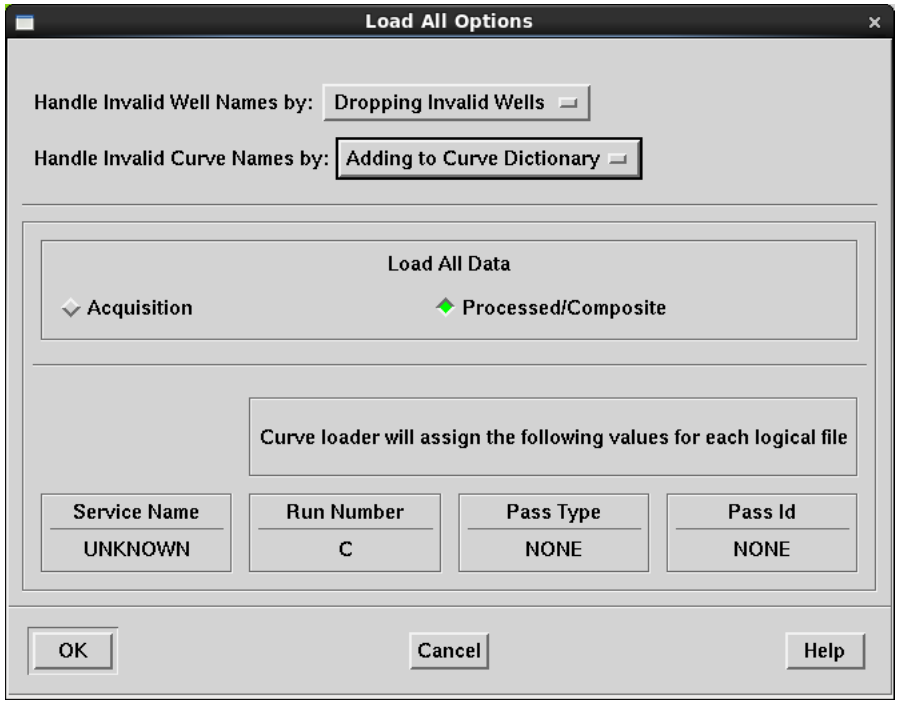
12. In the Curve Loader window, select `poslog1` as the Input Data File, set the Format Type to **ASCII**, and select the Format File you just created and saved.



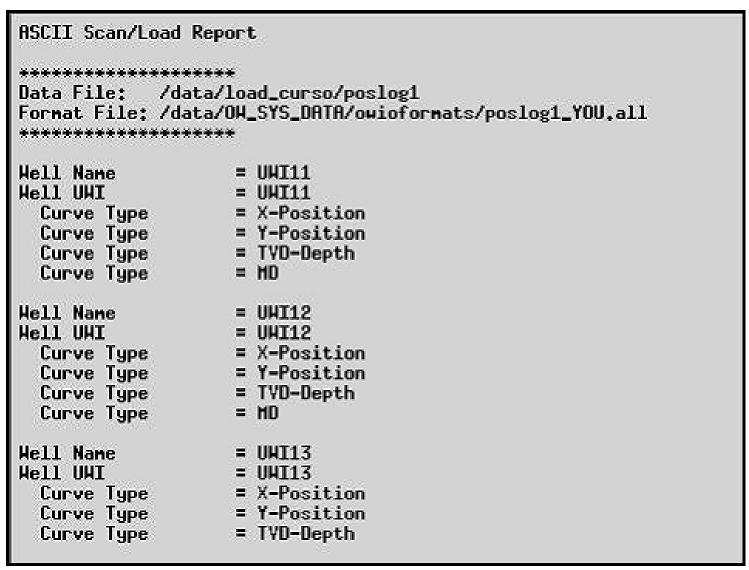
13. Select **File > Scan** from the Curve Loader window. Click **OK** to dismiss the Scan dialog box. The scanned data displays in the bottom half of the window, and in the Scan File Report (select **Reports > Scan Report**).



14. Select **File > Load All** from the Curve Loader window. Handle invalid well names by **Dropping Invalid Wells**. Handle invalid curve names by **Adding to Curve Dictionary**. Load All Data as **Processed/Composite**.



Select **OK** to begin the load. Monitor the load progress in the lower half of the Curve Loader window.



```
ASCII Scan/Load Report

********************
Data File:   /data/load_curso/poslog1
Format File: /data/OW_SYS_DATA/owioformats/poslog1_YOU.all
********************

Well Name          = UWI11
Well UWI           = UWI11
  Curve Type       = X-Position
  Curve Type       = Y-Position
  Curve Type       = TVD-Depth
  Curve Type       = MD

Well Name          = UWI12
Well UWI           = UWI12
  Curve Type       = X-Position
  Curve Type       = Y-Position
  Curve Type       = TVD-Depth
  Curve Type       = MD

Well Name          = UWI13
Well UWI           = UWI13
  Curve Type       = X-Position
  Curve Type       = Y-Position
  Curve Type       = TVD-Depth
```

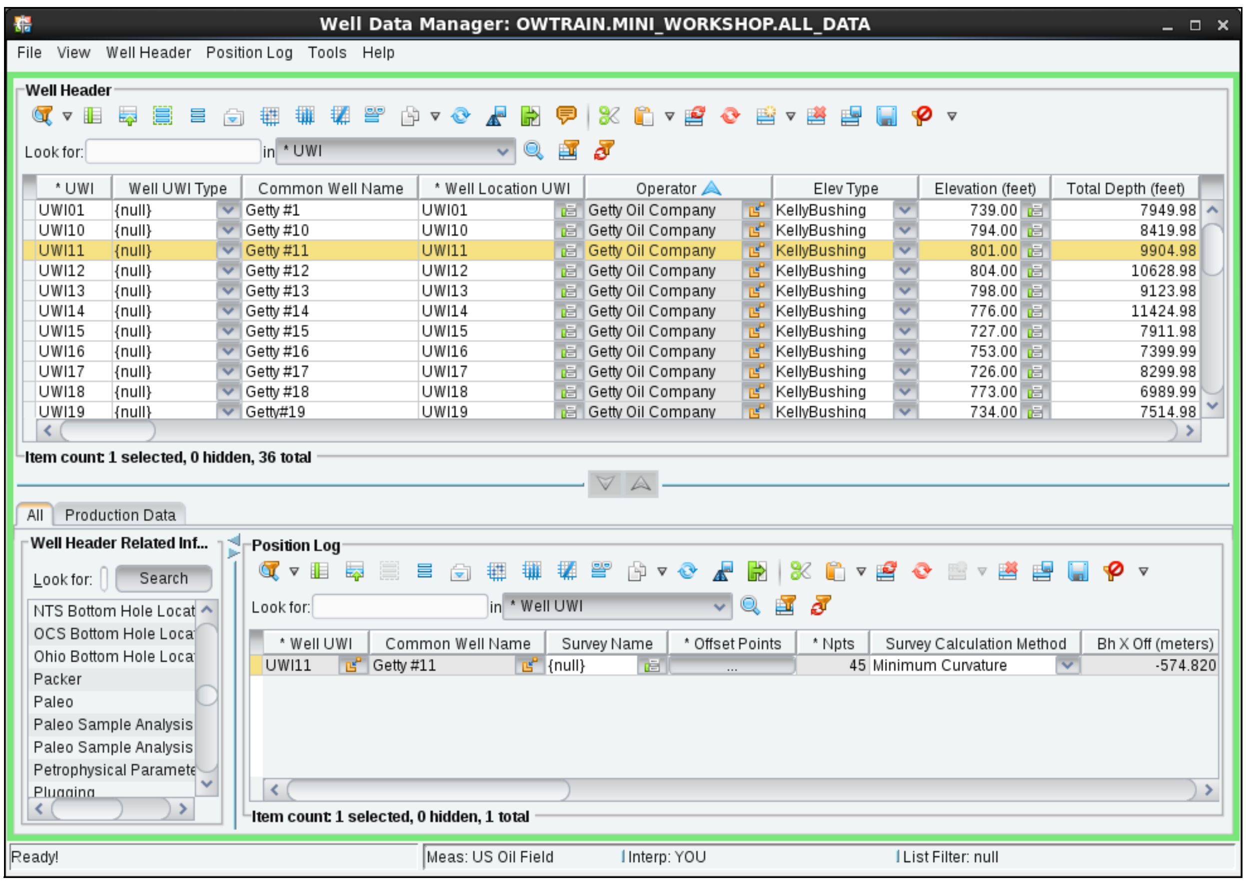
15. Click **Close** to dismiss the Load All window. Exit the Curve Loader.

Exercise 5-8. Using Well Data Manager to Confirm

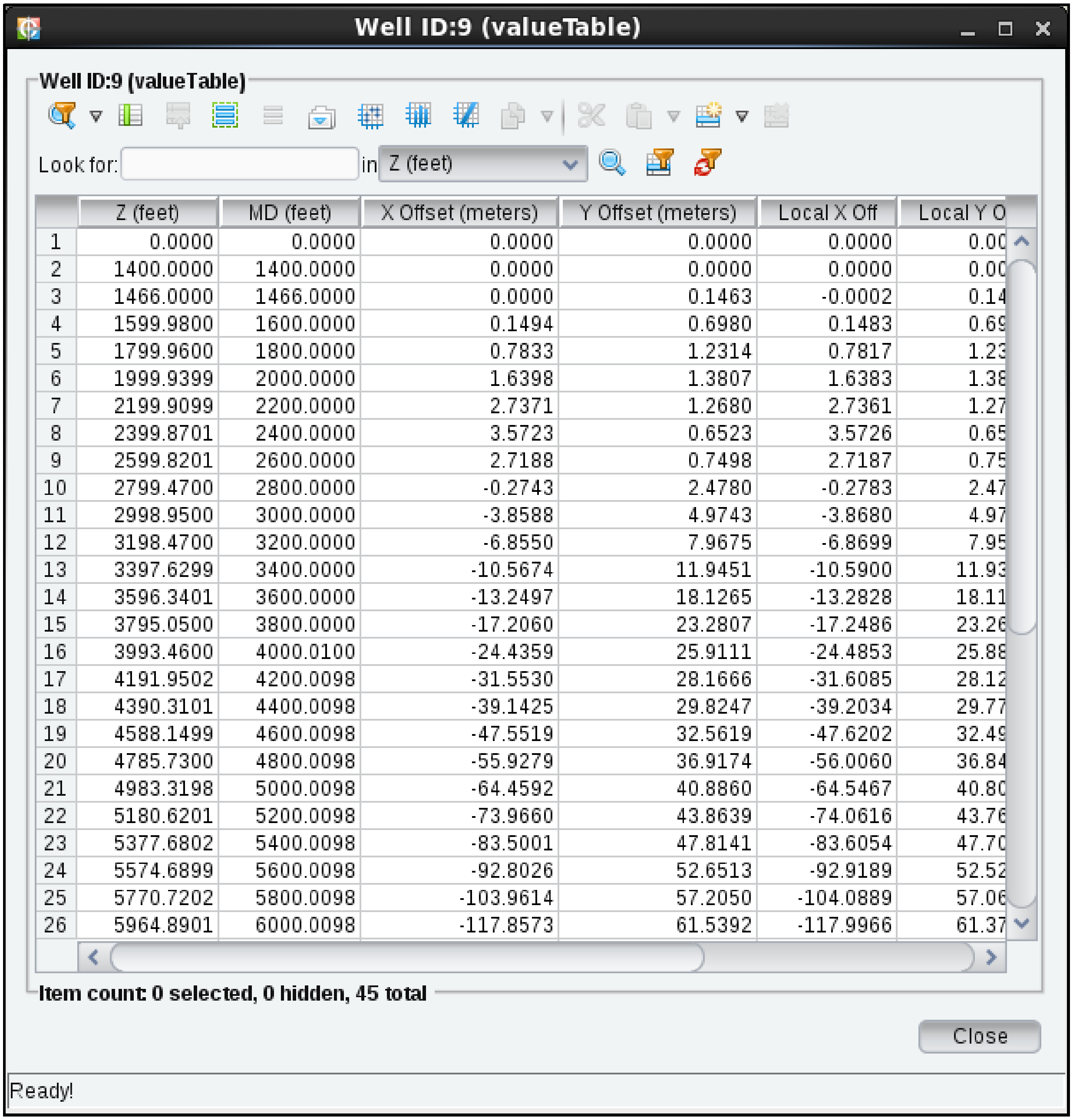
In this short exercise you will use the Well Data Manager to verify that both Directional Surveys and Position Logs were loaded into the database. For the wells with Directional Surveys, you will see that Position Logs were automatically generated.

1. Open **Well Data Manager** and select the **<All Well Header>** wells list.

2. You loaded the position logs for wells Getty #11 - Getty # 15. Select any of these wells and open **Position Log** from the Well Header Related Information list.

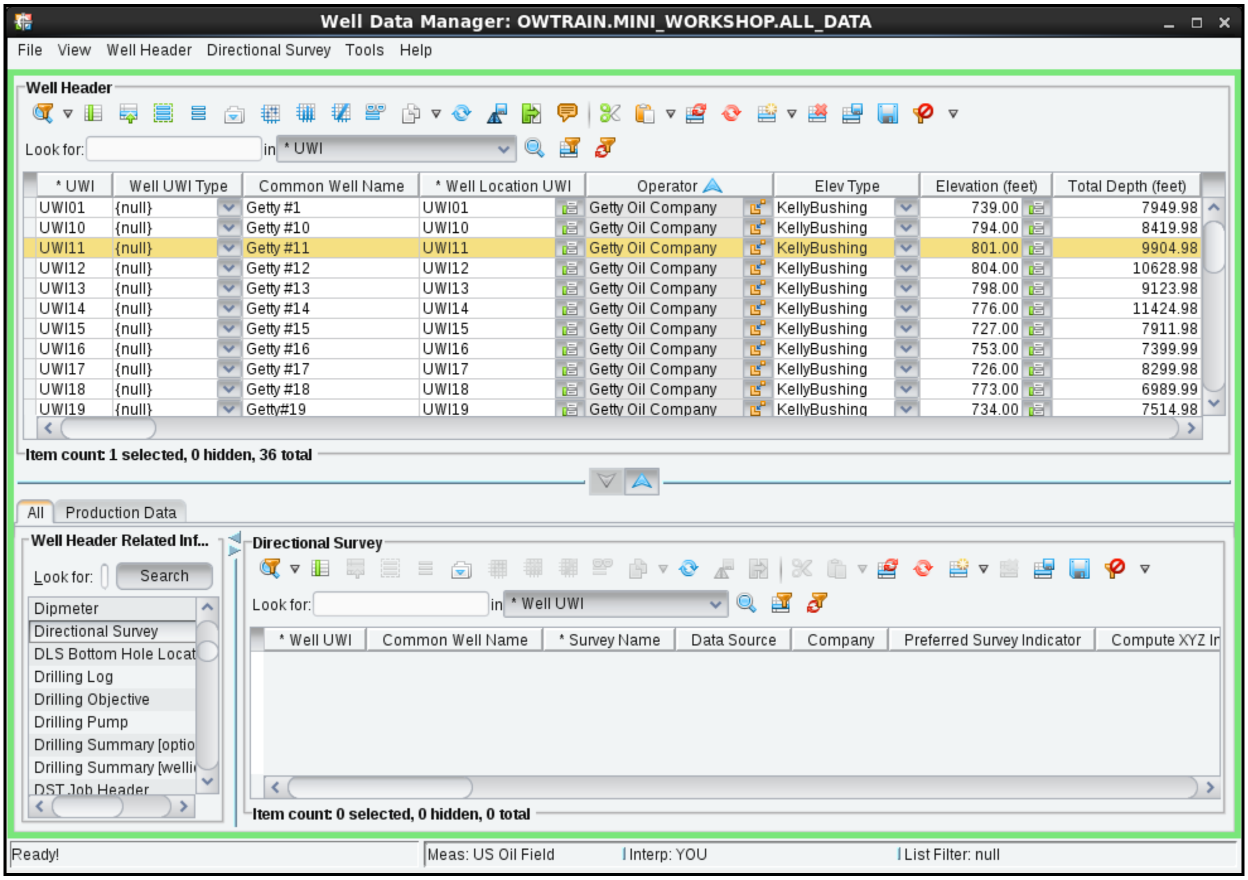


3. The position log header display in the lower portion of the dialog box. To see the values loaded for the position log, click *** Offset Points** in the header. A new window opens displaying the data values for the position log.



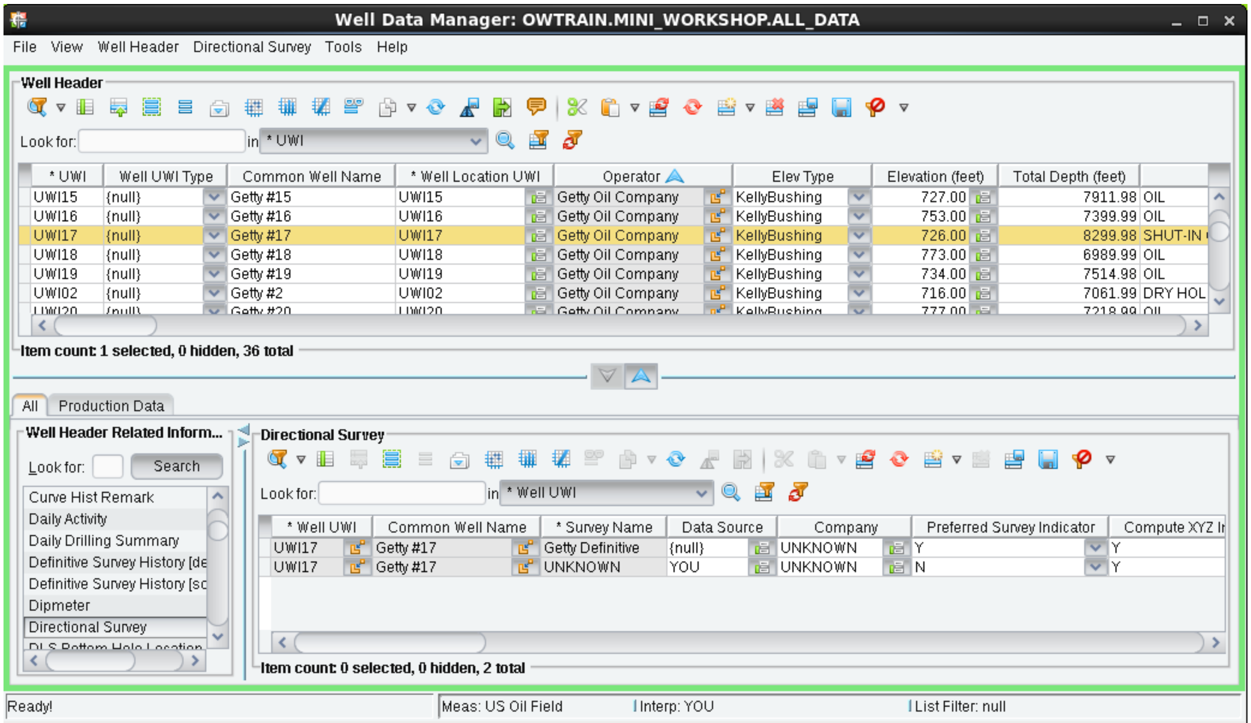
	Z (feet)	MD (feet)	X Offset (meters)	Y Offset (meters)	Local X Off	Local Y O
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
2	1400.0000	1400.0000	0.0000	0.0000	0.0000	0.00
3	1466.0000	1466.0000	0.0000	0.1463	-0.0002	0.14
4	1599.9800	1600.0000	0.1494	0.6980	0.1483	0.69
5	1799.9600	1800.0000	0.7833	1.2314	0.7817	1.23
6	1999.9399	2000.0000	1.6398	1.3807	1.6383	1.38
7	2199.9099	2200.0000	2.7371	1.2680	2.7361	1.27
8	2399.8701	2400.0000	3.5723	0.6523	3.5726	0.65
9	2599.8201	2600.0000	2.7188	0.7498	2.7187	0.75
10	2799.4700	2800.0000	-0.2743	2.4780	-0.2783	2.47
11	2998.9500	3000.0000	-3.8588	4.9743	-3.8680	4.97
12	3198.4700	3200.0000	-6.8550	7.9675	-6.8699	7.95
13	3397.6299	3400.0000	-10.5674	11.9451	-10.5900	11.93
14	3596.3401	3600.0000	-13.2497	18.1265	-13.2828	18.11
15	3795.0500	3800.0000	-17.2060	23.2807	-17.2486	23.26
16	3993.4600	4000.0100	-24.4359	25.9111	-24.4853	25.88
17	4191.9502	4200.0098	-31.5530	28.1666	-31.6085	28.12
18	4390.3101	4400.0098	-39.1425	29.8247	-39.2034	29.77
19	4588.1499	4600.0098	-47.5519	32.5619	-47.6202	32.49
20	4785.7300	4800.0098	-55.9279	36.9174	-56.0060	36.84
21	4983.3198	5000.0098	-64.4592	40.8860	-64.5467	40.80
22	5180.6201	5200.0098	-73.9660	43.8639	-74.0616	43.76
23	5377.6802	5400.0098	-83.5001	47.8141	-83.6054	47.70
24	5574.6899	5600.0098	-92.8026	52.6513	-92.9189	52.52
25	5770.7202	5800.0098	-103.9614	57.2050	-104.0889	57.06
26	5964.8901	6000.0098	-117.8573	61.5392	-117.9966	61.37

4. For the same well, open **Directional Survey** in the Well Header Related Information list.

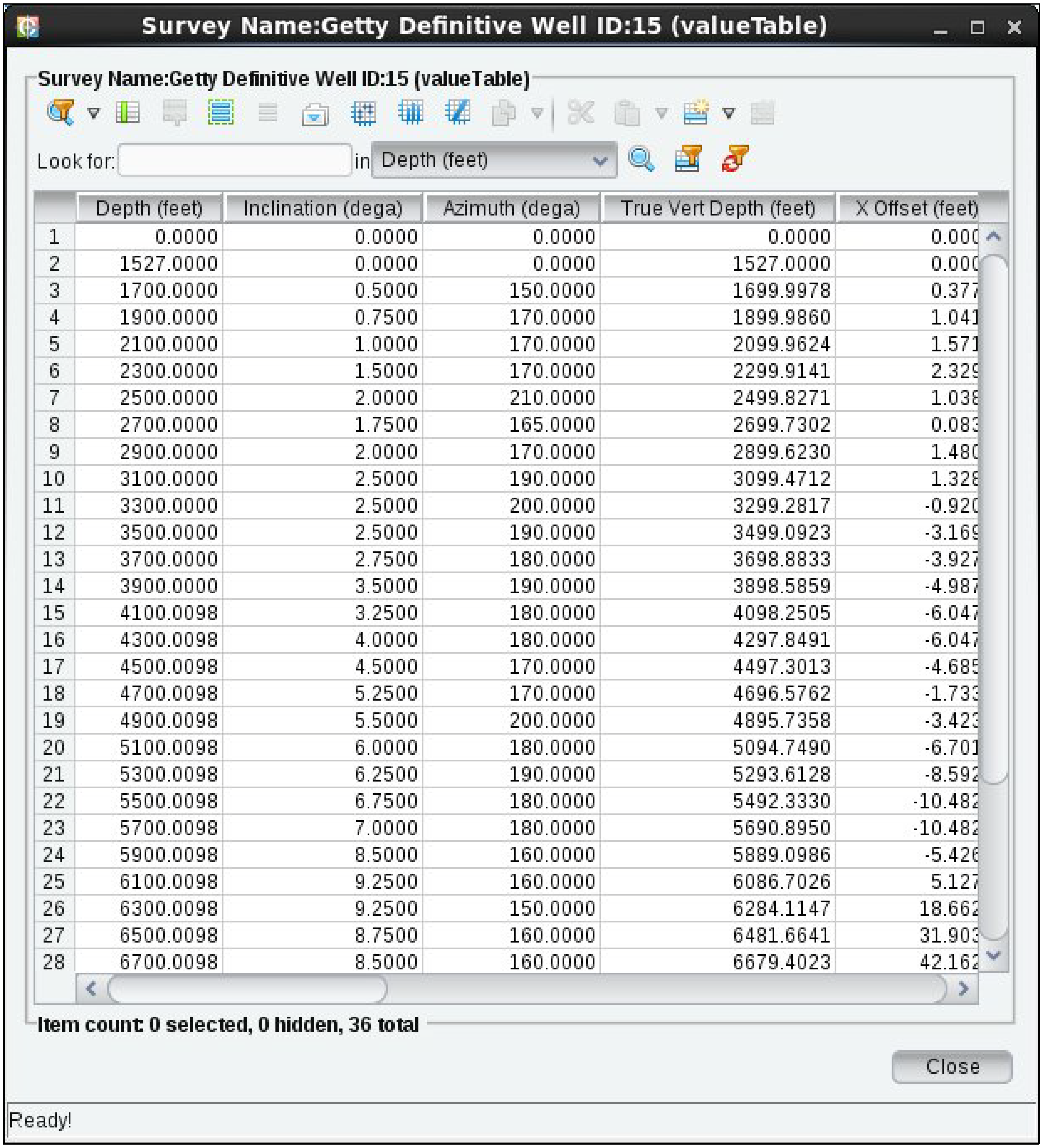


Observe that Directional survey for that well is empty, because you only loaded Position log data for that well.

5. You loaded **Directional Surveys** for **wells 16-24** and **32**. Select any of these wells, and open the Directional Survey Data form to see what you loaded.

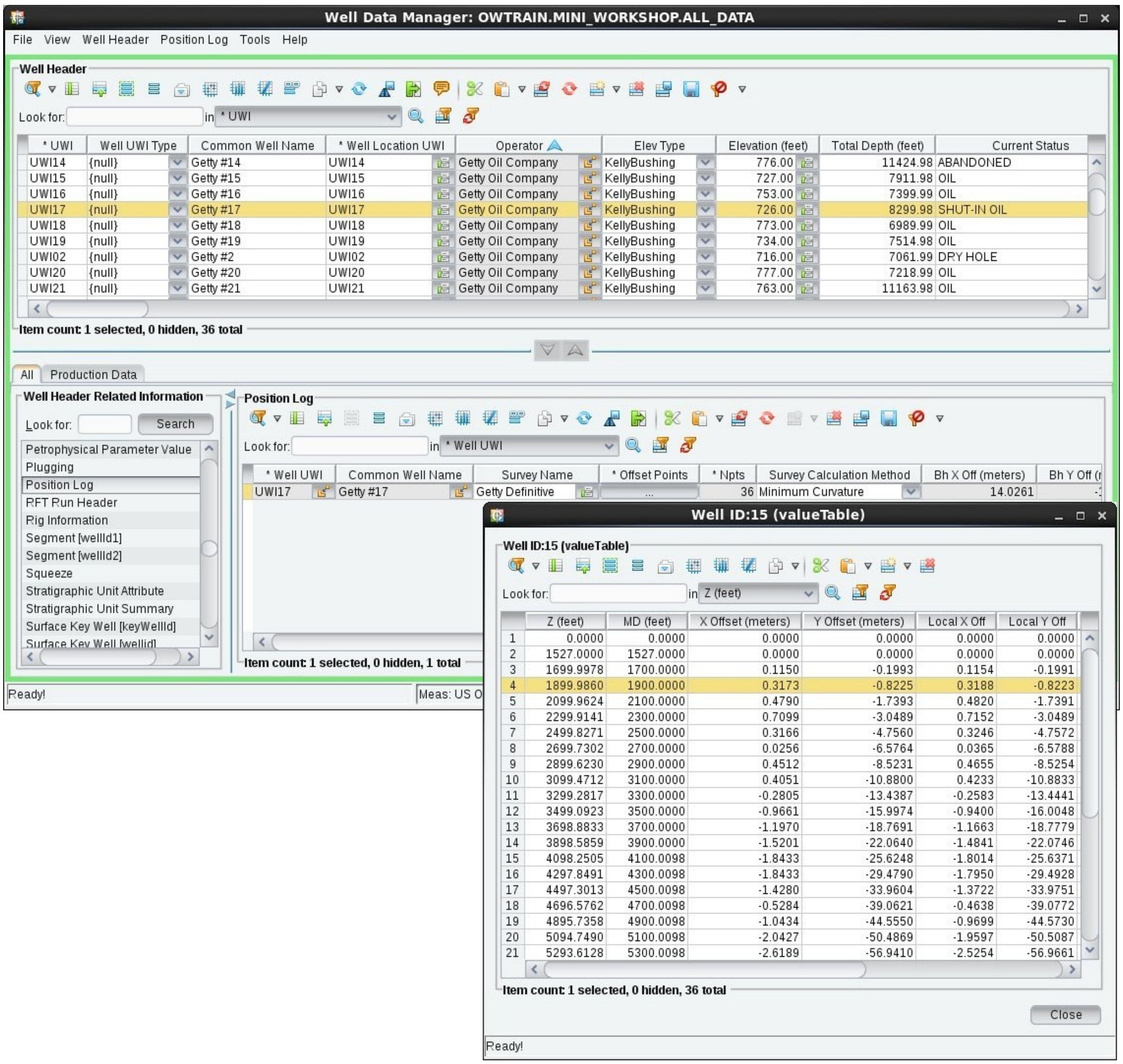


6. To look at the values of the curve, scroll to the right, and click **Survey Points**; you should see something like this:



	Depth (feet)	Inclination (dega)	Azimuth (dega)	True Vert Depth (feet)	X Offset (feet)
1	0.0000	0.0000	0.0000	0.0000	0.000
2	1527.0000	0.0000	0.0000	1527.0000	0.000
3	1700.0000	0.5000	150.0000	1699.9978	0.377
4	1900.0000	0.7500	170.0000	1899.9860	1.041
5	2100.0000	1.0000	170.0000	2099.9624	1.571
6	2300.0000	1.5000	170.0000	2299.9141	2.329
7	2500.0000	2.0000	210.0000	2499.8271	1.038
8	2700.0000	1.7500	165.0000	2699.7302	0.083
9	2900.0000	2.0000	170.0000	2899.6230	1.480
10	3100.0000	2.5000	190.0000	3099.4712	1.328
11	3300.0000	2.5000	200.0000	3299.2817	-0.920
12	3500.0000	2.5000	190.0000	3499.0923	-3.169
13	3700.0000	2.7500	180.0000	3698.8833	-3.927
14	3900.0000	3.5000	190.0000	3898.5859	-4.987
15	4100.0098	3.2500	180.0000	4098.2505	-6.047
16	4300.0098	4.0000	180.0000	4297.8491	-6.047
17	4500.0098	4.5000	170.0000	4497.3013	-4.685
18	4700.0098	5.2500	170.0000	4696.5762	-1.733
19	4900.0098	5.5000	200.0000	4895.7358	-3.423
20	5100.0098	6.0000	180.0000	5094.7490	-6.701
21	5300.0098	6.2500	190.0000	5293.6128	-8.592
22	5500.0098	6.7500	180.0000	5492.3330	-10.482
23	5700.0098	7.0000	180.0000	5690.8950	-10.482
24	5900.0098	8.5000	160.0000	5889.0986	-5.426
25	6100.0098	9.2500	160.0000	6086.7026	5.127
26	6300.0098	9.2500	150.0000	6284.1147	18.662
27	6500.0098	8.7500	160.0000	6481.6641	31.903
28	6700.0098	8.5000	160.0000	6679.4023	42.162

7. For the same well, open **Position Log** from the Well Header Related Data list and observe that a position log exists for this well, even though you did not import it. When you load a directional survey, a position log is automatically calculated from that survey.



8. Exit from Well Data Manager.

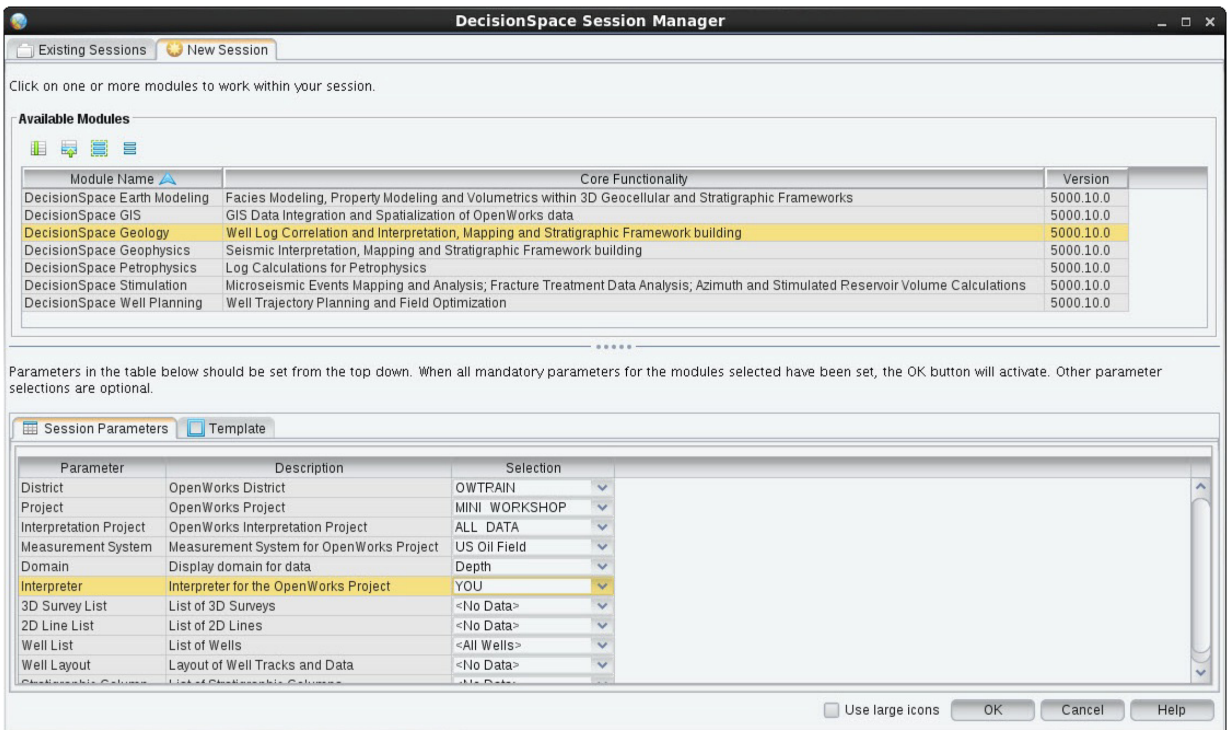
Exercise 5-9. Using DecisionSpace Geosciences Software to Confirm Wellbores

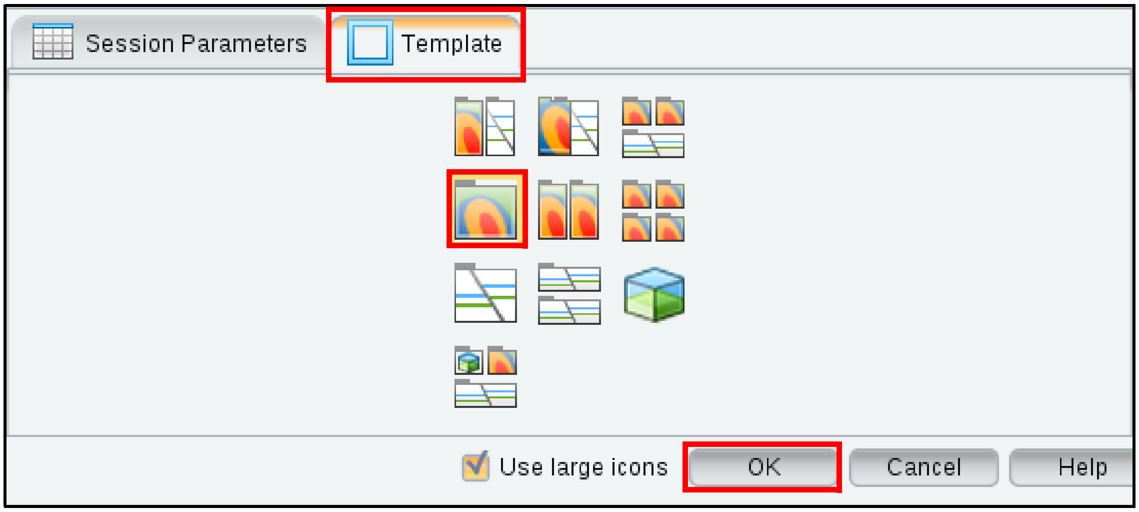
1. Create a well list containing only the Getty wells. Name the list `Getty Wells`. For specific information on how to create the well list, refer to Chapter 3.

2. Exit the Well List Manager.

3. Select **Applications > DecisionSpace Geosciences**.

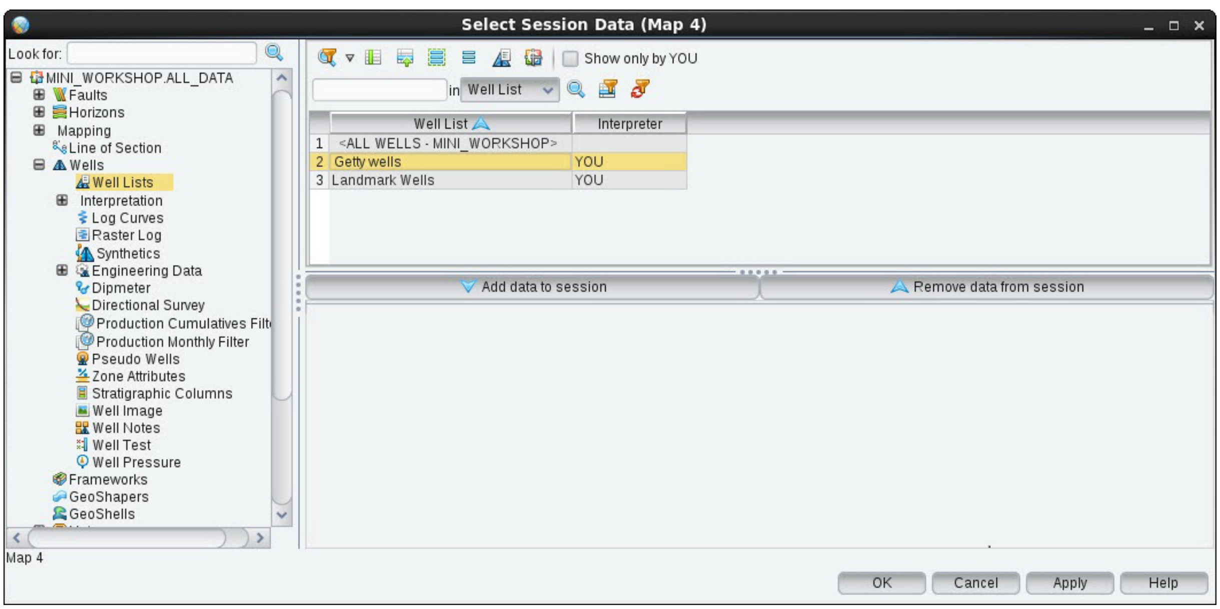
4. Create a new session in the DS Geosciences software.





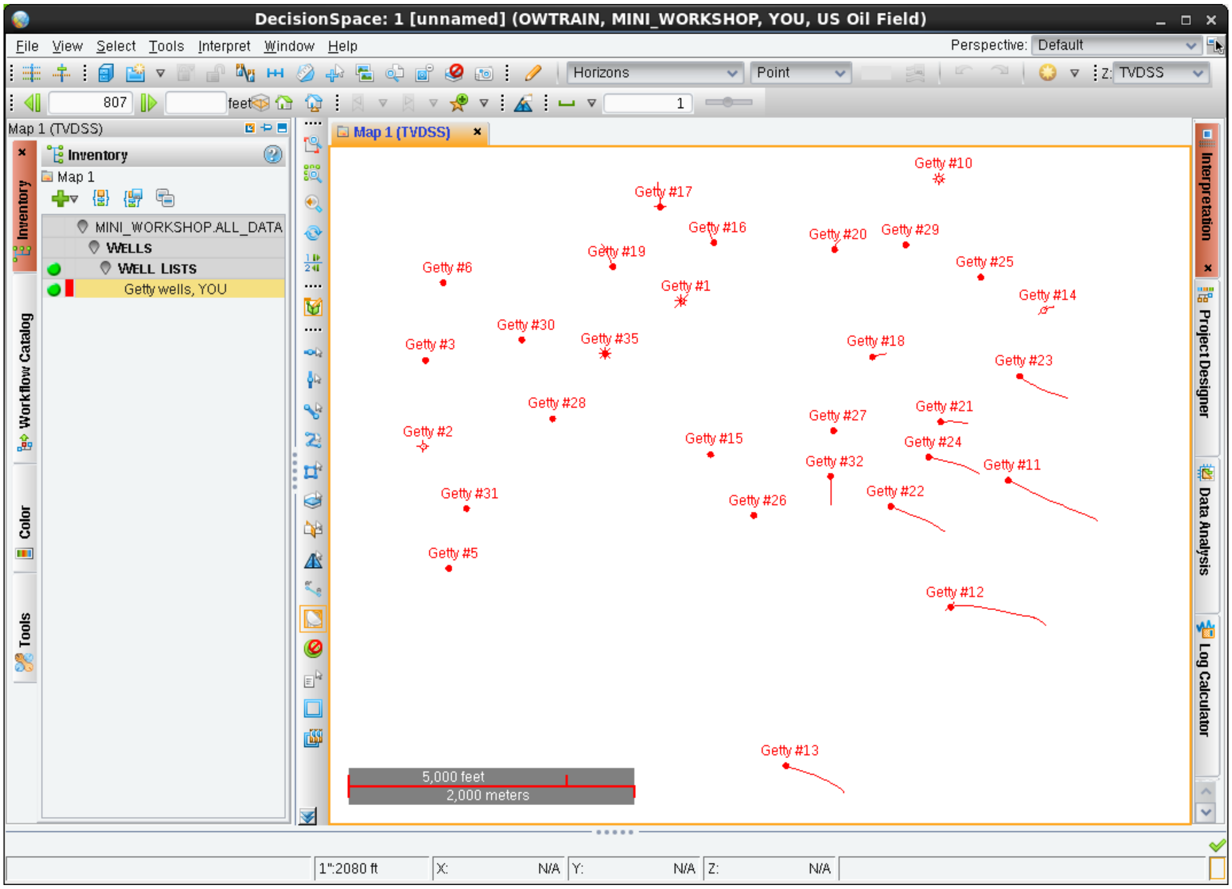
5. DecisionSpace software opens the Map window. Go to **File > Select Session Data**, or click the file cabinet icon .

6. In the **Select Session Data** window, go to **Wells** and click on the existing well list. Click on the **Add Data to Session** button to add the well list you've just created to the map.



7. Change the **Name** annotation to **Bottom** and Symbol annotation also to **Bottom**. For specific information on how to display well data, refer to Exercise 3-8, Displaying and Verifying Well Data.

8. You should see your deviated wells now.



Your picture should look similar to the one above. Position logs are represented by the red lines on your map.

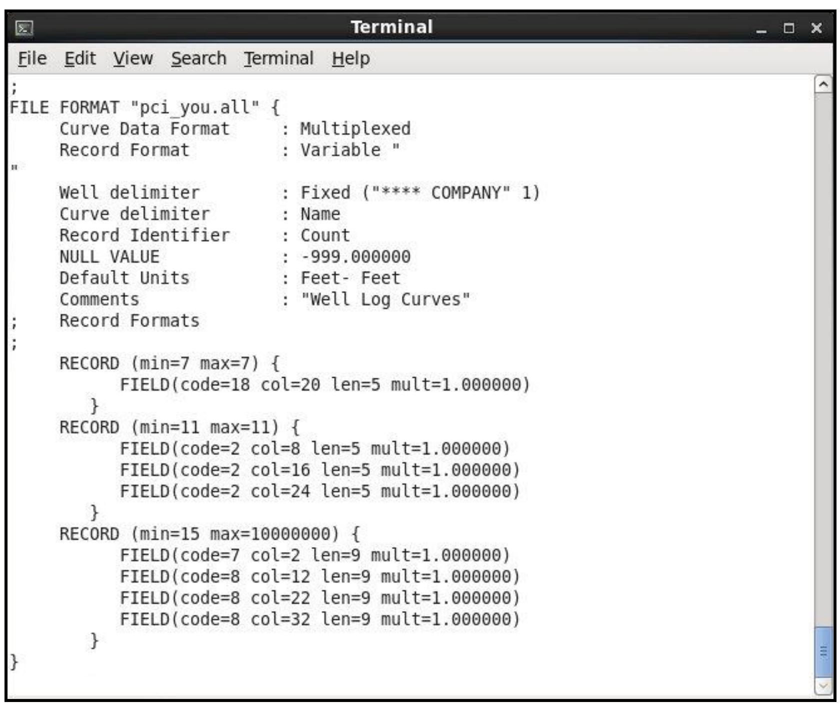
9. Exit the DecisionSpace Geosciences software.

Field Definitions

Each record format contains one or more field definitions. Each field definition begins with FIELD and must include the following arguments. All of these arguments must be enclosed in a single set of parentheses:

Argument	Description
<1-31>	Integer code. Certain integer codes are specific to the type of curve. The integer codes for each curve type are shown in the tables following this one.
<starting_column>	You must specify a starting column for each field. You specify the starting column as an integer value.
<field_length>	You must specify a field length for the field. You specify the field length as an integer value.
<multiplier>	You must specify a multiplier by which the field data will be multiplied before it is loaded to the project. The multiplier must be a real value. If the field data does not require any numerical conversion, this multiplier should be 1.

Below is an example of a format file containing field definitions.




```
;
FILE FORMAT "pci_you.all" {
     Curve Data Format     : Multiplexed
     Record Format         : Variable "
"
     Well delimiter        : Fixed ("**** COMPANY" 1)
     Curve delimiter       : Name
     Record Identifier     : Count
     NULL VALUE            : -999.000000
     Default Units         : Feet- Feet
     Comments              : "Well Log Curves"
;    Record Formats
;
     RECORD (min=7 max=7) {
           FIELD(code=18 col=20 len=5 mult=1.000000)
        }
     RECORD (min=11 max=11) {
           FIELD(code=2 col=8 len=5 mult=1.000000)
           FIELD(code=2 col=16 len=5 mult=1.000000)
           FIELD(code=2 col=24 len=5 mult=1.000000)
        }
     RECORD (min=15 max=10000000) {
           FIELD(code=7 col=2 len=9 mult=1.000000)
           FIELD(code=8 col=12 len=9 mult=1.000000)
           FIELD(code=8 col=22 len=9 mult=1.000000)
           FIELD(code=8 col=32 len=9 mult=1.000000)
        }
}
```

Integer Codes for Well Log Curves

Integer Code	Field	Comments
1	Common Well Name	External name of well
18	Primary Well ID	
19	Secondary Well ID	Alternate well identifier
2	Curve Dictionary Name	Curve name as cataloged in the Curve Dictionary
3	Curve Top Depth	Required only if depth of measurement is not supplied on the curve data records
4	Curve Bottom Depth	Required only if depth of measurement is not supplied on the curve data records
5	Curve Sample Interval	Required only if depth of measurement is not supplied on the curve data records
6	Curve Depth Units	If not present, depth units can be provided on the Default units line

Integer Codes for Directional Surveys

Integer Code	Field	Comments
1	Common Well Name	External name of well
18	Primary Well ID	
19	Secondary Well ID	Alternate well identifier
6	Curve Depth Units	If not present, depth units can be provided on the Default units line.
7	Depth of Measurement	At most one depth is allowed per record (MD-default).
12	Survey Datum	Datum associated with the survey. If you do not enter the survey datum, KB is used. If KB is unavailable, 0.0 is written for the datum value and a warning message is written to the load report.
13	Deviation Degrees	Can be in degrees plus a decimal fraction. See comment below.
14	Deviation Minutes	Can be in minutes plus a decimal fraction. If both deviation degrees and minutes are filled out, then the two fields are converted to degrees and summed. If only one of the two is filled out, the single value is interpreted as the entire deviation.
15	Bearing Degrees	Can be in degrees plus a decimal fraction. See comment below.
16	Bearing Minutes	Can be in minutes plus a decimal fraction. If both deviation degrees and minutes are filled out, then the two fields are converted to degrees and summed. If only one of the two is filled out, the single value is interpreted as the entire deviation.
17	Quadrant Relative Bearing	In the form N45W

Integer Codes for Position Logs

Integer Code	Field	Comments
1	Common Well Name	External name of well
18	Primary Well ID	
19	Secondary Well ID	Alternate well identifier
6	Curve Depth Units	If not present, depth units can be provided on the Default units line
32	Depth of Measurement—TVD	Only one depth per record. True Vertical Depth
33	Depth of Measurement—MD	Only one depth per record. Measured depth
12	Survey Datum	Datum associated with the survey. If you so not enter the survey datum, KB is used. If KB is unavailable, **0.0** is written for the datum value and a warning message is written to the load report.
29	X-Position	For signed numbers, *East* is positive. You can also use alphanumeric strings of the form 112.34N, N112.34, or 112 North.
30	Y-Position	For signed numbers, North is positive. You can use alphanumeric strings to indicate offset direction
31	Calculation Method	This is an encoded field indicating how a position log was calculated: 1 = tangential, 2 = Average Angle, 3 = Radius of Curvature, 4 = Average Angle, 5 = Tangential. If no value is loaded, the method defaults to 1.

Integer Codes for Synthetic Seismograms

Integer Code	Field	Comments
1	Common Well Name	External name of well
18	Primary Well ID	
19	Secondary Well ID	Alternate well identifier
20	Synthetic name	
21	Start Time	Required only if a time curve is not explicitly included
22	End Time	Required only if a time curve is not explicitly included
23	Sample Increment	Required only if a time curve is not explicitly included
24	Travel Time	Can only be omitted if start time, end time, and sample interval are provided. Value is in seconds.
25	Amplitude Value	

Integer Codes for Time-Depth Tables

Integer Code	Field	Comments
1	Common Well Name	External name of well
6	Depth Units	F or M
9	Interpreter’s Initials	
12	Datum	Datum associated with the survey. If you so not enter the survey datum, KB is used. If KB is unavailable, 0.0 is written for the datum value and a warning message is written to the load report.
18	Primary Well ID	
19	Secondary Well ID	Alternate well identifier
28	Time-Depth Table Name	
26	Depth	TVD-default, SSTVD
27	Time	Two-way travel time in seconds

Mnemonic Arguments

The following arguments are optional. The arguments are useful for recording comments within your file and for identifying the various types of values in your file format. Using these arguments when you define a file format enables you to identify the components of your file format.

Argument	Description
`; <text>`	If a semicolon is included in a line, all text following the semicolon is ignored up to the end of the current line. Thus, comments can be entered following a semicolon on any line of the specification file.
`Val=`	You may preface any value that specifies a character marker value with this argument.
`col=`	You may preface any value that specifies a column marker or a starting column with this argument.
`len=`	You may preface any value that specifies a record length or a field length with this argument.
`key=`	For a record identified by marker field, you may preface the key value with this argument.
`min=`	For a record identified by count, you may preface the minimum count with this argument.
`max=`	For a record identified by count, you may preface the maximum count with this argument.
`code=`	You may preface the integer codes in your field definitions with this argument.
`mult=`	You may preface the multiplier values in your field definitions with this argument.

Chapter **6**

Using the Curve Dictionary

The Curve Dictionary allows you to enter, view, and filter curve definitions in an OpenWorks software database. Specifically, this utility reads and writes to the `VC_LOG_CRV_NAME` table, which holds curve information. Curve names can be added manually, or automatically by an application when it creates a curve.

The Curve Dictionary also includes information about the display and the units of measurement attributes for a curve. Through proper management of curve entries and their attributes, the amount of time and effort required to display curves can be significantly reduced. In addition, proper units of measurement ensure that correct units are used in curve calculations.

Chapter Objectives

The Curve Dictionary functions as a reference for all curves displayed, manipulated, or created during interpretation. Any OpenWorks application that displays or manipulates log curve information (for example, StratWorks software Correlation or PetroWorks software) requires input from the Curve Dictionary.

In this lesson you will learn how to:

- Modify curve display parameters
- Modify curve measurement unit parameters
- Add curve names to the Curve Dictionary
- Remove curve names from the Curve Dictionary
- Set user curve defaults
- Add, modify or delete logging services
- Create, copy, and edit curve alias lists

Curve Dictionary: An Introduction

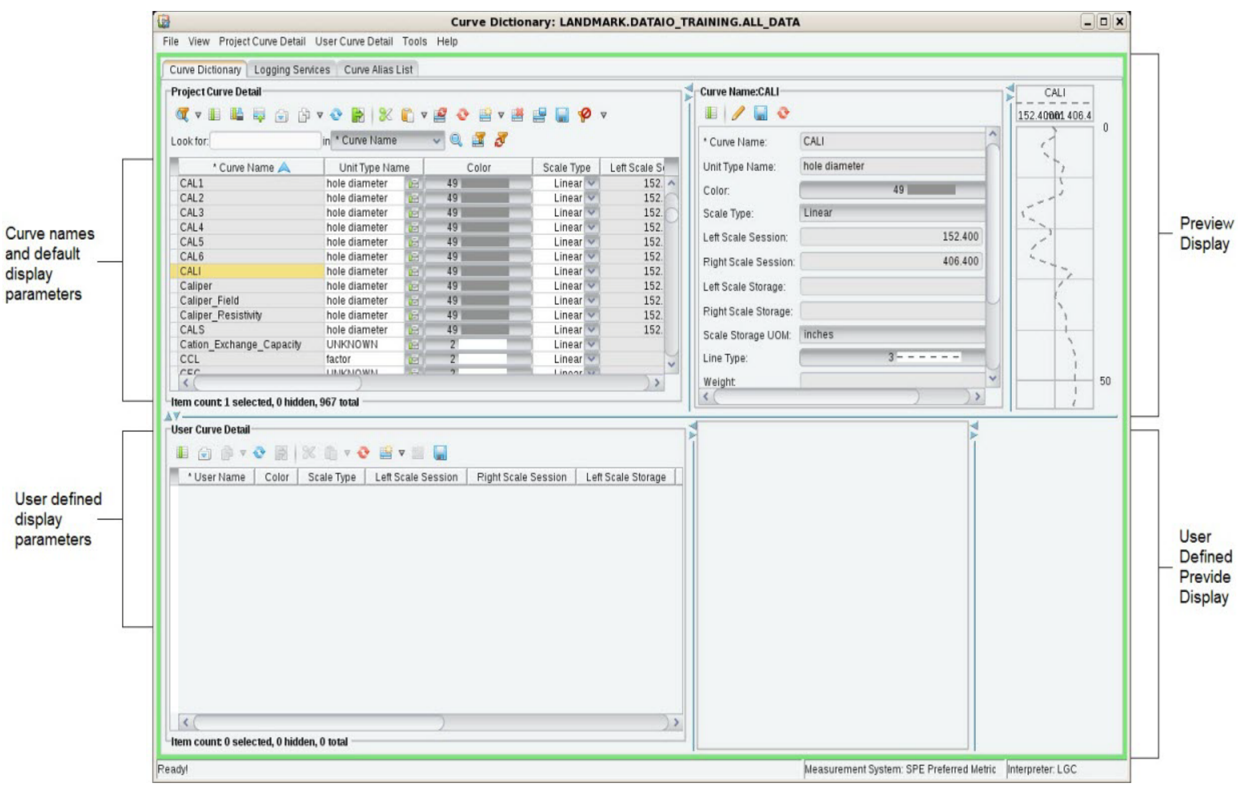
The Curve Dictionary is a utility that manages wellbore data curve names. The Curve Dictionary is pre-populated with nearly 1,000 curve names. These names fall into the following categories:

- 300 are standard names used by various wireline and logging-while drilling (LWD) vendors
- 100 are specific to Halliburton
- 400 are from PetroWorks software applications

Additional curve names come from core property names, Curve Alias names, or outputs from other Landmark applications, such as SynTool software.

Appearance

The main window of the Curve Dictionary is shown here.



This window is divided into two main parts:

Project curve detail: Upper part of the window. Where you can see and edit default parameters for all curves in the project. Any modification made here will affect all instances of the curve. On the right side of the window, you can set the display parameters and see the changes in the preview display.

User curve detail: Lower part of the window. It is used to customized the display parameters for a curve only for a user. This setting will override the defaults but only for the selected user.

Display Parameters

Data Field	Description
Curve Name	Indicates selected curve name.
Unit Type Name	Type of curves. You select it from a predefined list.
Scale Type	Used to measure curve units (linear or logarithmic).
Left Scale	Numeric value of the left log scale. You can also change the units for this scale, but it is limited by the Curve Unit Type selection.
Right Scale	Numeric value of the right log scale. You can also change the units for this scale, but it is limited by the Curve Unit Type selection.
Line Color	Color of a line. The color is selected from a palette of 64 OpenWorks colors.
Line Type	The manner in which a line is displayed (solid, dashed, etc.).
Weight	Thickness of a line.
Track	The side of the depth track (left or right) where a curve appears. This field is used by SeisWorks software.
Remark	A brief description of the curve.

Purpose and Use

The Curve Dictionary allows you to enter, view, and filter curve Definitions. OpenWorks applications use this information to store, create, manipulate, and display curve data. The Curve Dictionary can be used to:

- Add curves to the current curve list.
- Delete curves from the current curve list.
- Modify default display parameters used by OpenWorks applications.
- Create user-specific defaults for existing curve entries. These defaults override the general default values.
- Add logging services and their descriptions to the Logging Service list.
- Modify Curve Alias lists through the addition, deletion, and reordering of the curve names on those lists.
- Limit the curves loaded to the database based on their existence in the curve list.

Units Handling

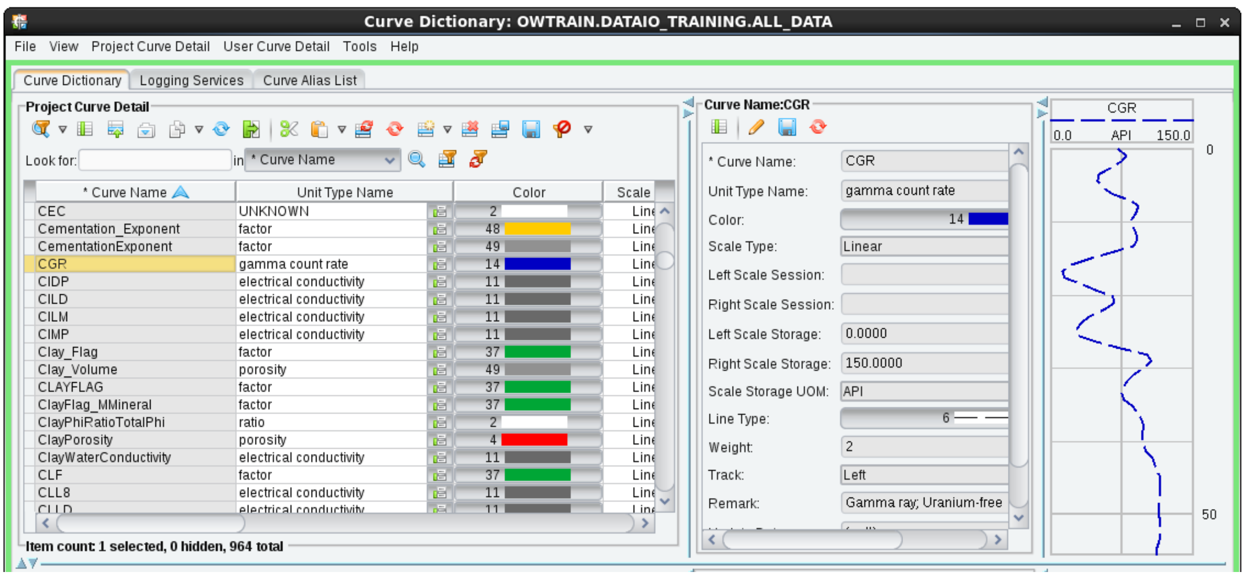
Curve unit handling is an exception to the way other data units are handled in the OpenWorks software. Recall that when an OpenWorks project is created, a measurement system is specified for the project. The project measurement system provides default units of measure handling for the project. Original units of measurement are converted to project units of measurement if original and project units are not the same. Log curve units, however, are always loaded to the project in their original units of measurement. For display purposes, applications can display data in the units defined by the session measurement system, which may be different than the project measurement system. If you are using a session measurement system when you retrieve a curve, that curve is displayed in units of the session measurement system. If curves are created by applications in that session, they are loaded to the OpenWorks software in the session measurement system units.

Modifying Curve Display Parameters

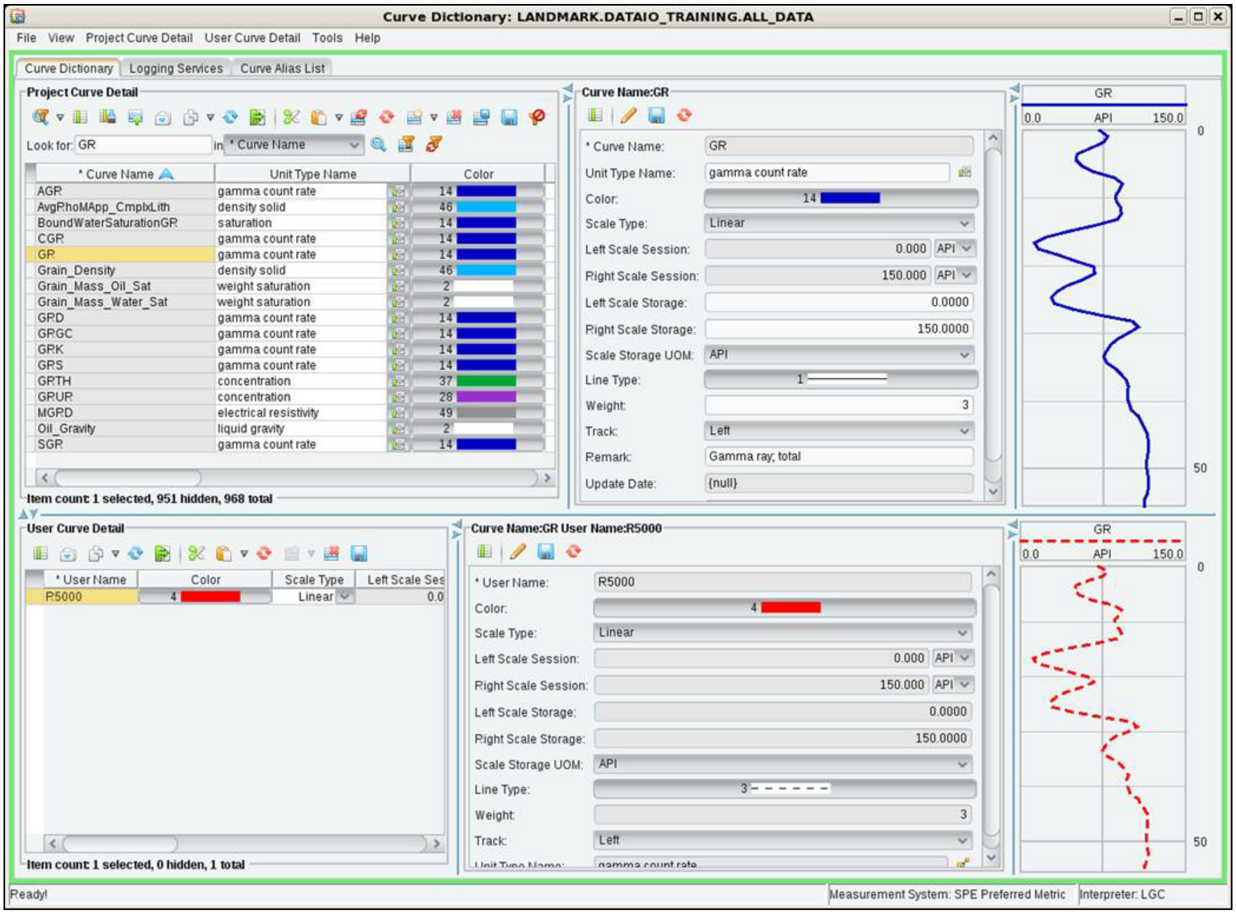
Curve Dictionary is used to set default parameters for curve displays. If defaults are set properly, the time needed to create templates and plot curves is minimized because applications retrieve display information directly from the Curve Dictionary.

Curve display defaults are set using one of two methods:

- Select the desired curve. Make necessary display changes to Line Style, Weight, and Color, and to Scale, and so on, then click the **Save Changes** button. Changes made in this manner apply to all users using default settings.



- Select the desired curve. Click the **Add new user Crv default** icon. Make necessary display changes to Line Style, Weight, and Color, and to Scale Type and Track Side, and click the **Save Changes** button. Changes made in this manner apply only to the displays made by your interpreter.

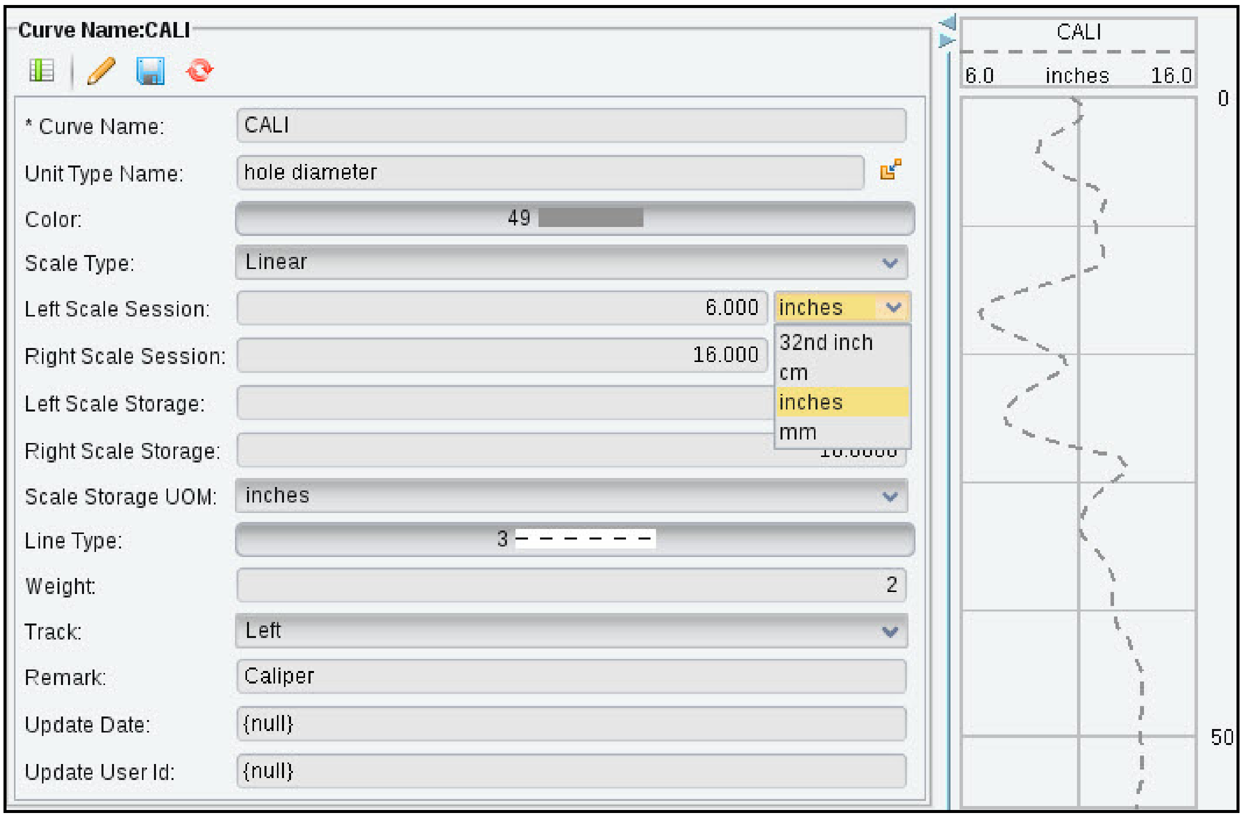


Your new display parameters should automatically be sent via PD™ software to any listening applications that display the selected curve.

Modifying Units of Measurement

Curve Dictionary is used to set units of measurement for curves. Certain applications (e.g., PetroWorks software) cannot create curves of the same name as those in the Curve Dictionary unless the units types and the calculated curve are compatible.

Setting or modifying curve units is a very simple process in this new curve dictionary, just click the list on the right of left scale and right scale and it will give you the available units in accordance with the unit type selected. After you make modifications click the **Save Changes** button.

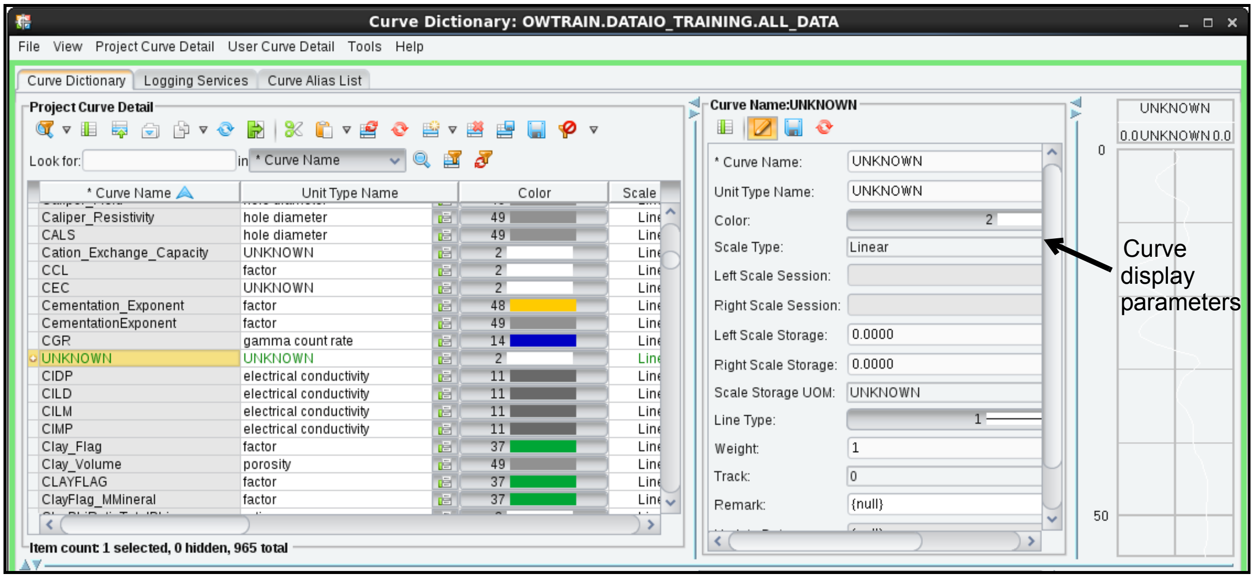


> **Note**
>
> You cannot make interpreter specific changes for the unit type, only scale and display parameters.

Adding Curve Names to the Dictionary

Occasionally, you may need to add a curve name to the Curve Dictionary.

To add a new curve to the Curve Dictionary, click the **Add New Project Curve Detail** button. This will add a new row to the list.



Set the curve display parameters beneath where you specify the curve name and on the right part of the window. When you finish click the **Save** button.

Removing Curve Names from the Curve Dictionary

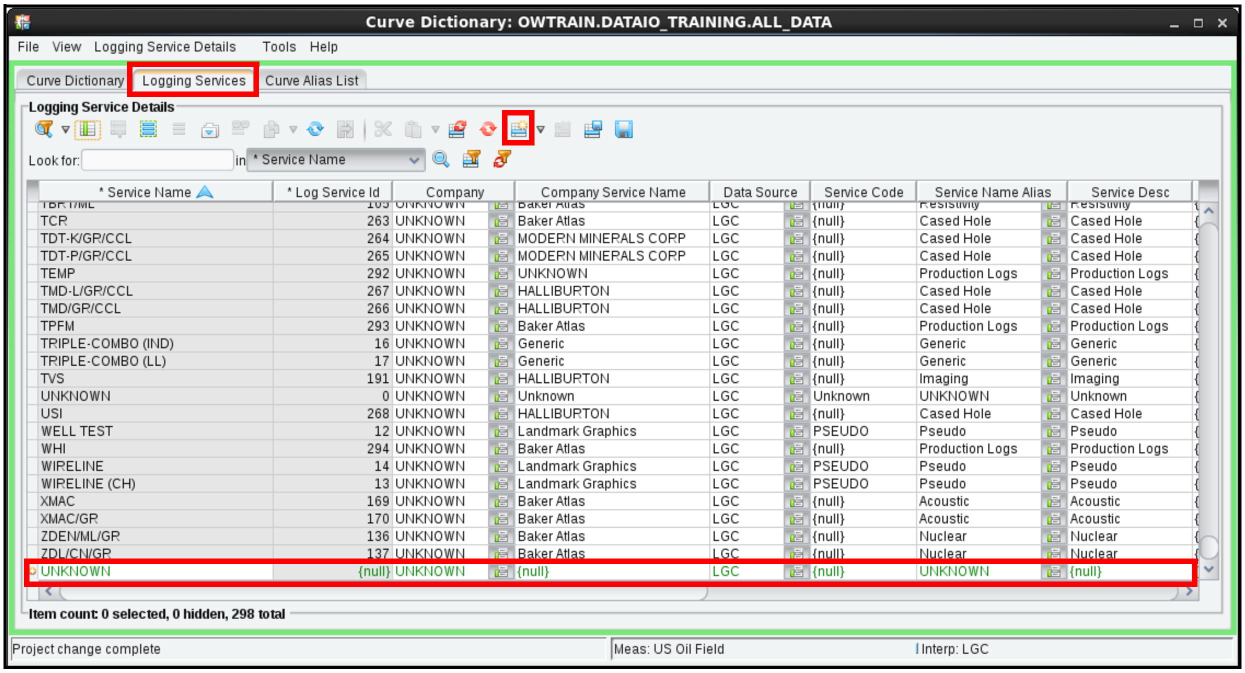
Occasionally, you may want to delete curve names from the Curve Dictionary. The name of a curve that is currently in use in a project cannot be deleted, but you can delete any other curve name. Only users with interpret or manage access authorization can delete curve names from the Curve Dictionary.

To delete a curve name, click the **Delete selected project curve detail** button, then the **Save** button.

Adding a Logging Service

In Landmark nomenclature, a Logging Service consists of the data from a group of physically joined logging tools which collect data at the same time. This is also referred to as a toolstring. The logging service name generally consists of the mnemonics of all the tools. A toolstring consisting of a gamma ray (GR), dual induction log (DIL), density (SDL), and neutron (DSNII) would have a logging service name of GR/DIL/SDL/DSNII. Occasionally, common logging services are given less arcane names, such as Triple Combo.

To add a logging service, click the **Logging Services** tab, and then click the **Add new logging service detail** button.

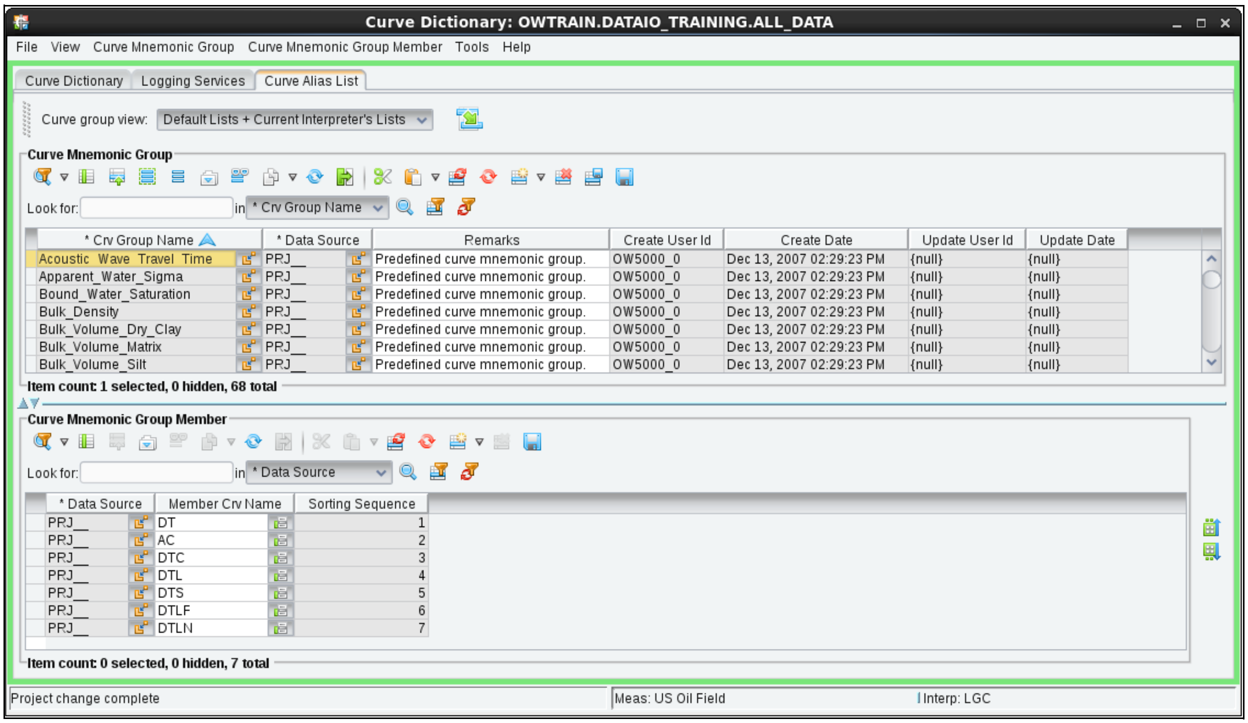


When you finish editing, click the **Save** button.

Curve Alias Lists

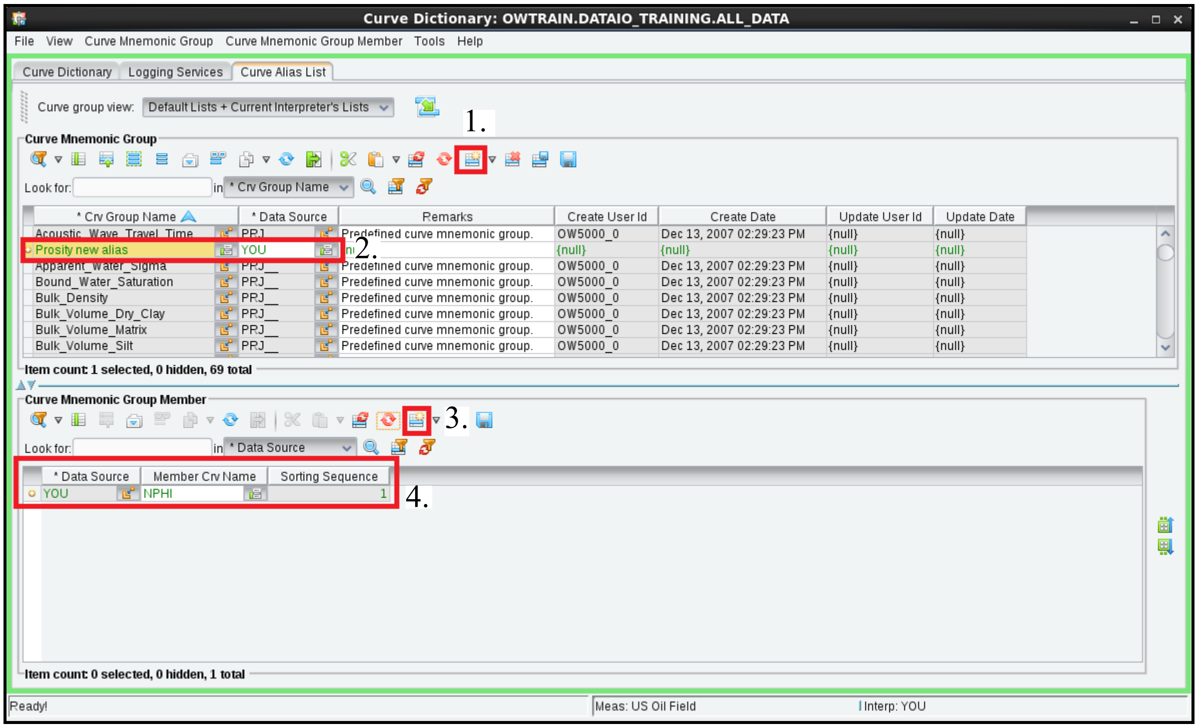
Curve aliasing allows you to indirectly request a curve from the OpenWorks software. This feature is often used with multiwell displays or processing. When you select a curve alias, the OpenWorks software searches the ordered list of names for that alias in order to retrieve a valid curve name. This process is repeated in each well so that different curve names can be used for the same type of curve.

To perform this function, click the **Curve Alias List** tab. You should see a window like this:

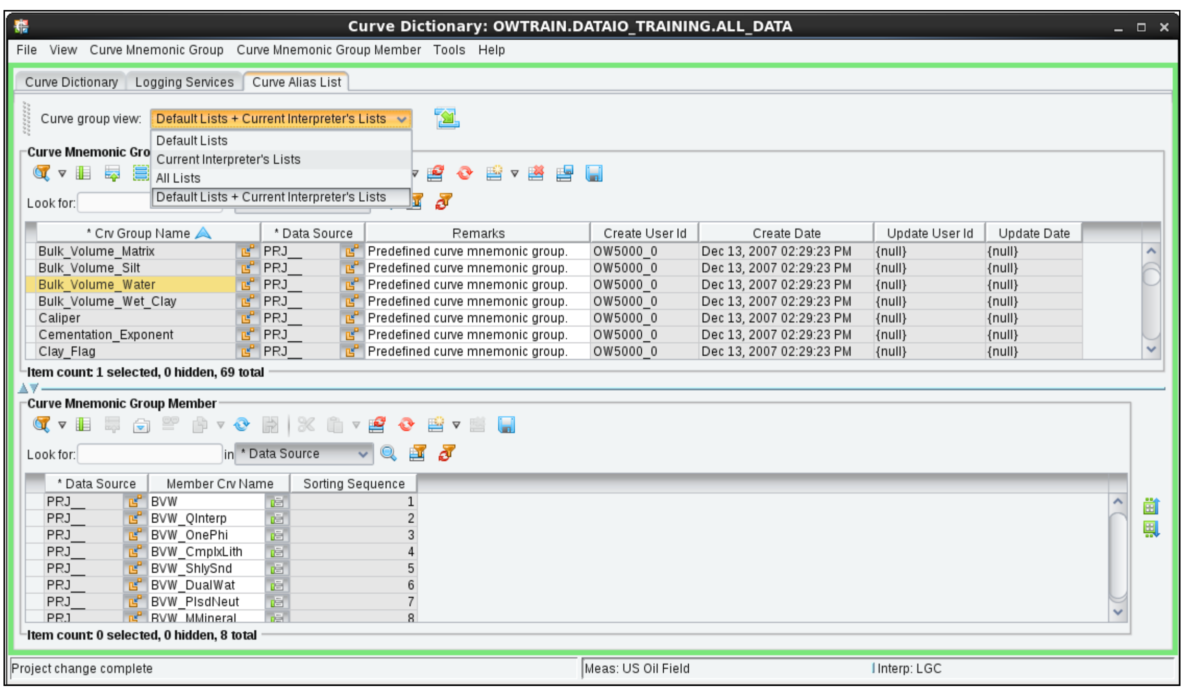


If **Acoustic_Wave_Travel_Time** (shown above) is used in a well display, then the appropriate curve is displayed for each well. If DT exists in Well 1, then DT is displayed. If AC exists in Well 2, but not DT, then AC will be displayed. If more than one curve on the Curve Alias List exists in a well, then the highest priority curve is displayed.

The Curve Alias List Manager allows you to add, delete, and rearrange curve names in the list. To create a new alias list:



When you save the changes, this will create a new alias for the defaults alias lists for all users, but you have the option to create alias lists only for your interpreter.



Curve Dictionary and OpenWorks Software Applications

Display parameters for the various curve types in the OpenWorks database are defined in the Curve Dictionary. These settings are used as defaults by the applications for example PowerView software or Single Well Viewer Edit Mode, and include:

- Scale type (linear or log)
- Left scale
- Right scale
- Line style
- Line weight
- Line color

Sometimes you can change the curve display parameters locally on the application, but for some applications the only way of changing the appearance of a curve is by updating the curve dictionary.

Exercise 6-1. Modifying Default Display Parameters

In this exercise you import a new curve into your project, then modify its default display parameters.

Adding Display Parameters for a New Curve

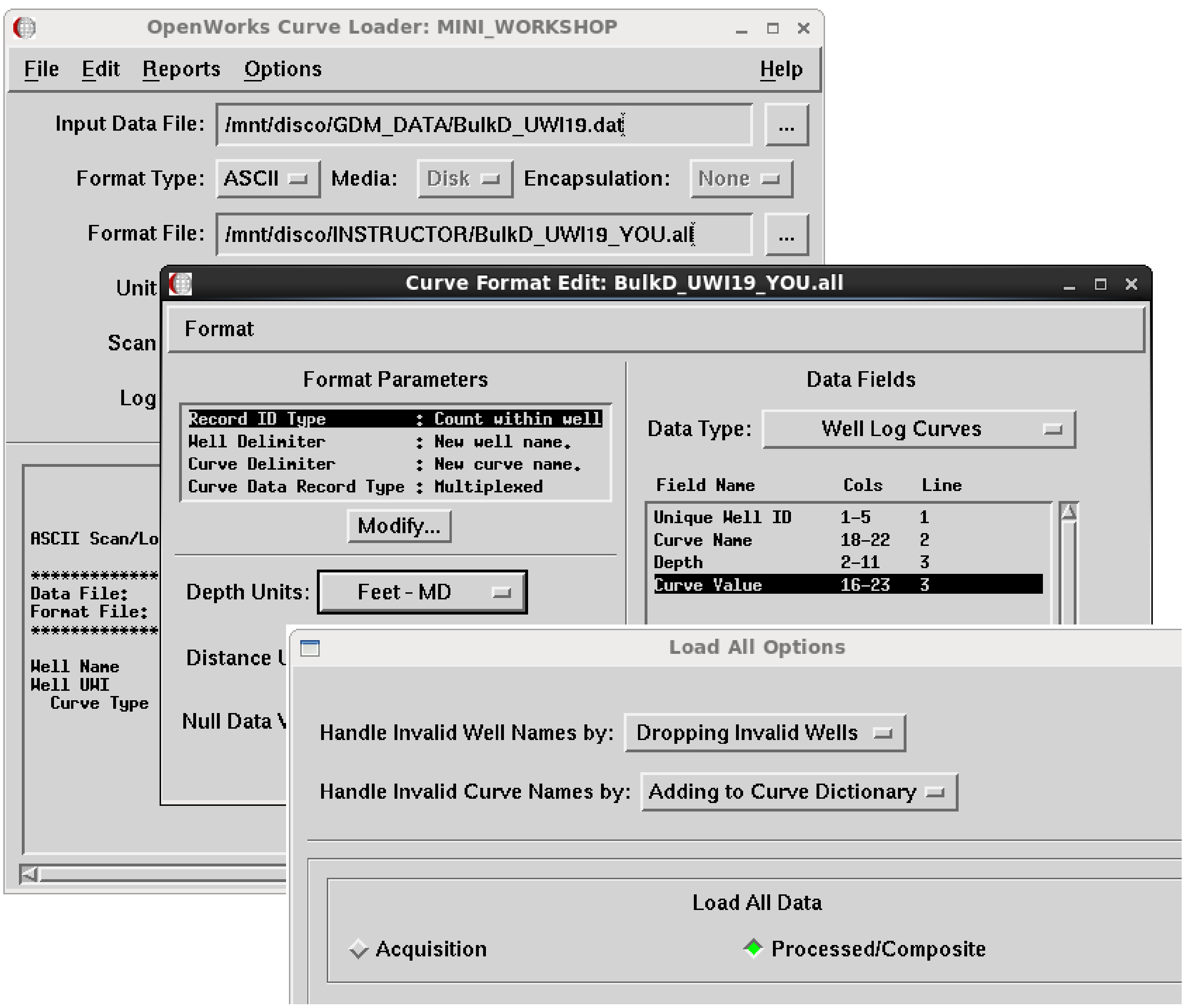
1. Open the Curve Loader and import the file **`BulkD_UWI19.dat`** into your OpenWorks project.

   You will have to create a new format file to describe this data.

   Define the format as shown below, then scan and load.

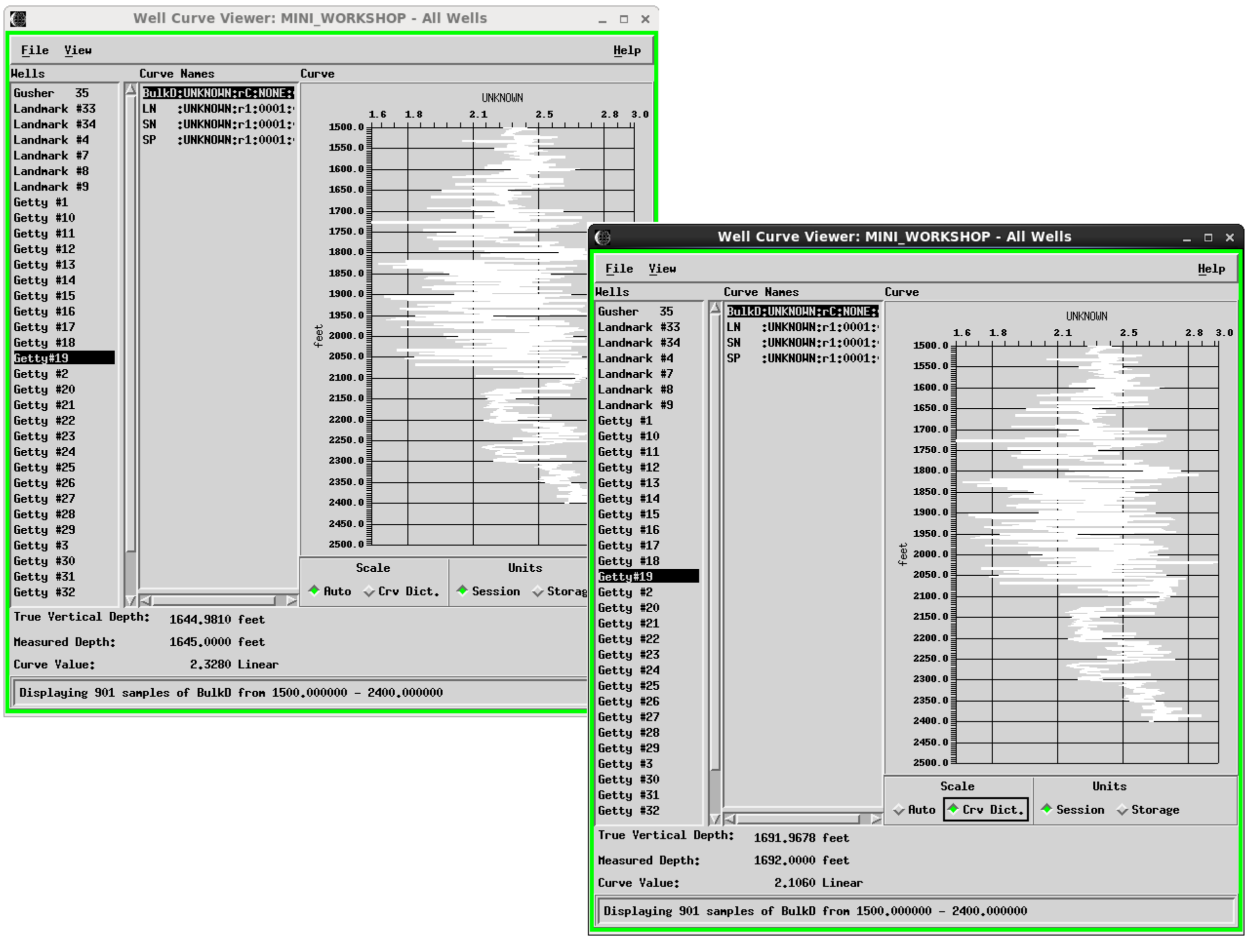
   Handle Invalid Curve Names by **Adding to Curve Dictionary**.

   Load All Data as **Processed/Composite**.



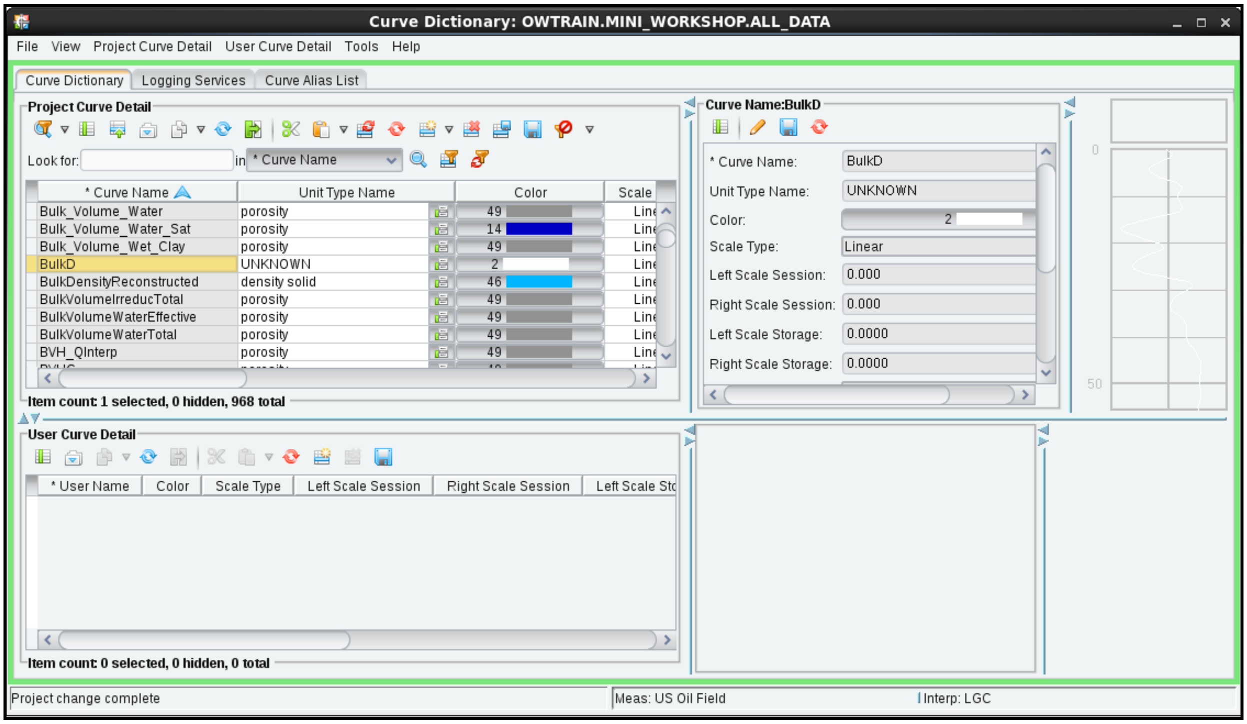
2. From the OpenWorks command menu, open **Well Curve Viewer**. When the Well Curve Viewer window displays, select **File** > **Read All**, then click well **Getty #19**, and curve **BulkD**.

   Since this curve was just added to the Curve Dictionary, notice that toggling **Scale** between **Auto** and **Crv Dict** has no effect.



3. Make sure that Well Curve Viewer is in “listening” mode by ensuring that there is a green border around the window. If the border is red, click on it with your cursor. It will change to green.

4. Open the curve dictionary from the OpenWorks command menu by selecting **Data > Management > Curve Dictionary**.



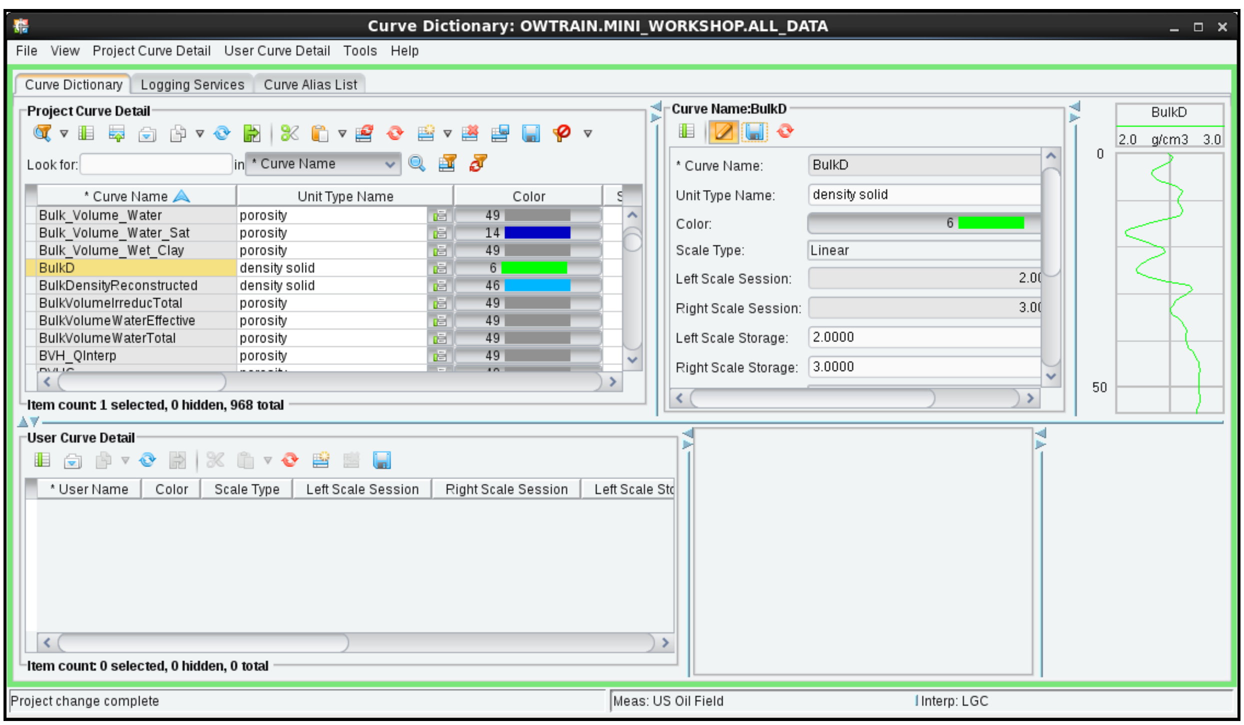
5. Scroll the Curve Names list and select the Curve Name **BulkD**. This is the curve you added to the Curve Dictionary.

6. To change the project display parameters for the BulkD curve, click the **Pencil** icon in the Curve Name:BulkD definition box, then click in the box next to the display parameter to change the value.

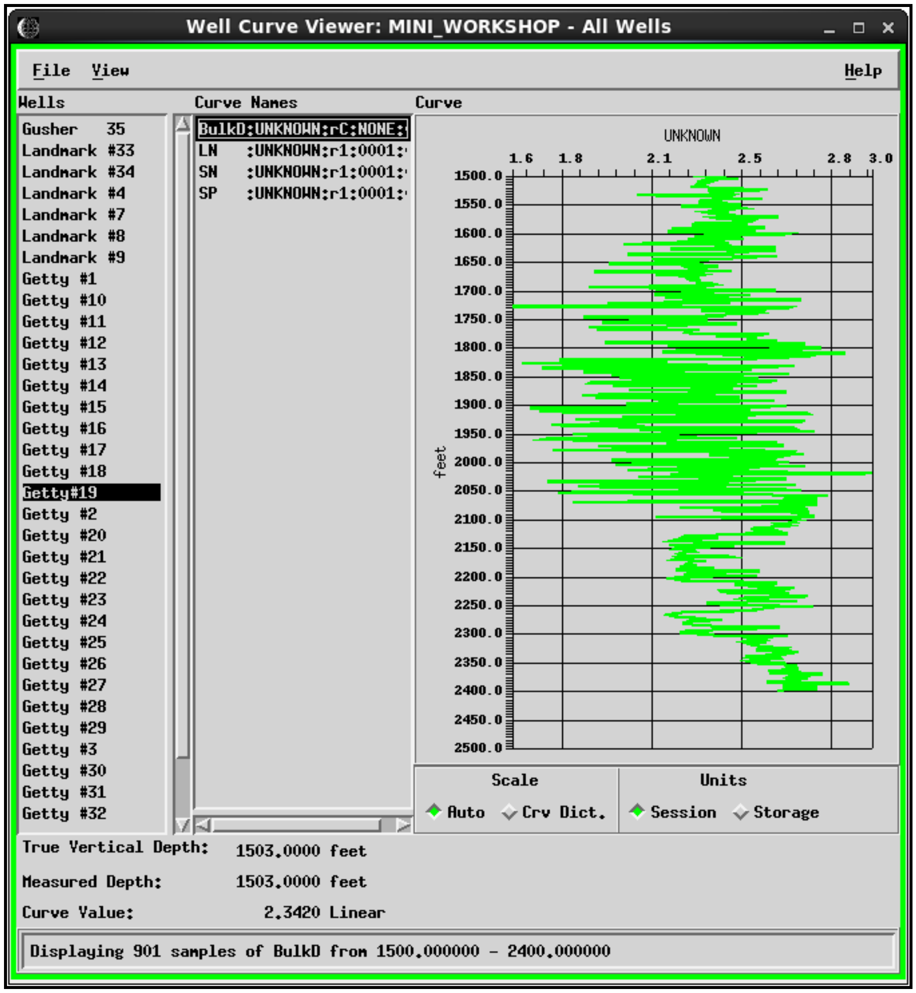
   For the curve **Unit Type Name**, click the pop-up pick list icon to the right of the box for a list of valid options.

Define the display parameters as follows. When changes are done, click the **Save** icon.

Line Weight	1
Line Color	Anything bright
Scale Type	Linear
Left Scale Storage	2.0
Right Scale Storage	3.0
Unit Type Name	Type “Density Solid”
Scale Storage UOM	g/cm^3



You will see your changes immediately on the listening Well Curve Viewer.



Modifying Display Parameters for Existing Curves

7. Modify the Curve Dictionary entry for **LN** as follows, then click **Save**.

Line Weight	1
Line Color	Anything bright
Scale Type	Log
Left Scale Storage	0.2
Right Scale Storage	2000.0

8. Modify the Curve Dictionary entry for **SN** as follows, then click **Save**.

Line Weight	1
Line Color	Anything bright
Scale Type	Log
Left Scale Storage	0.2
Right Scale Storage	2000.0

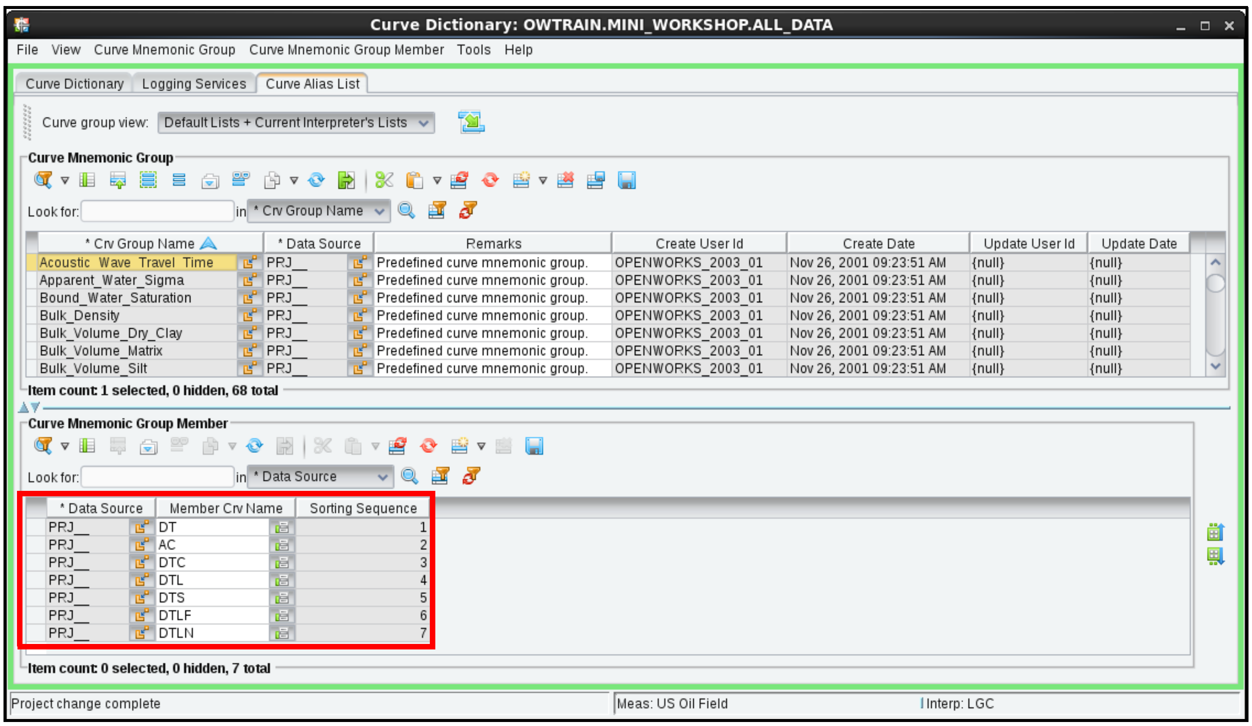
9. View curves **LN** and **SN** in the Well Curve Viewer to see the effect of your modifications.

10. Exit the Curve Dictionary and Well Curve Viewer.

Exercise 6-2. Modifying the Priority of Curve Aliases

Curve aliasing allows you to indirectly request a curve from the OpenWorks software. This feature is often used with multi-well displays or processing. When you select a curve alias for a well, the OpenWorks software searches the ordered list of curve names (Curve Group) to retrieve a curve available for that well. This process is repeated in each well so different curve names can be used for the same type of curve.

1. Open the Curve Dictionary and click the **Curve Alias List** tab. You will see a window with a table of curve group names (curve alias lists) in the top pane.

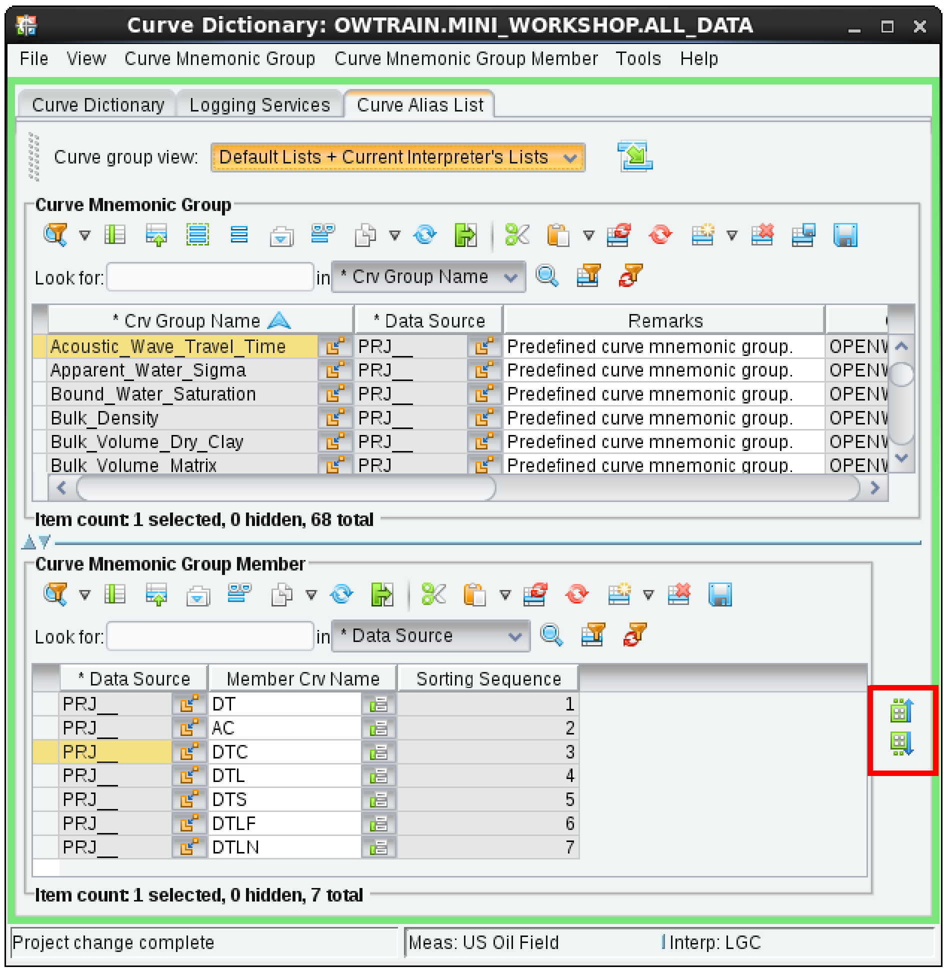


2. Select the curve group **Acoustic Wave_Travel_Time** (shown above). The child table in the bottom pane shows there are seven curve members for that curve alias.

   Notice the sorting sequence of the curves in the list. This sort order sets the priority of the curve members of the Acoustic Wave_Travel_Time curve alias. If more than one curve in the curve group exists in the OpenWorks database for a well, the highest priority curve is displayed for that well in OpenWorks software.

3. The Curve Alias List Manager allows you to add or delete curve members from the curve group. You can also change the sort order (priority) of the curve members.

   To change the sort order of the curves, highlight a member curve name. Click the **Move up** or **Move down** buttons to reposition the selected curve in the list as shown.



> **Note:**
>
> At this point, if you save the changes, this will affect the default curve alias list for **all users** in the project. It is best practice to create your own curve alias group with the curve members and priority you want, than to edit the project curve groups which will affect all users.

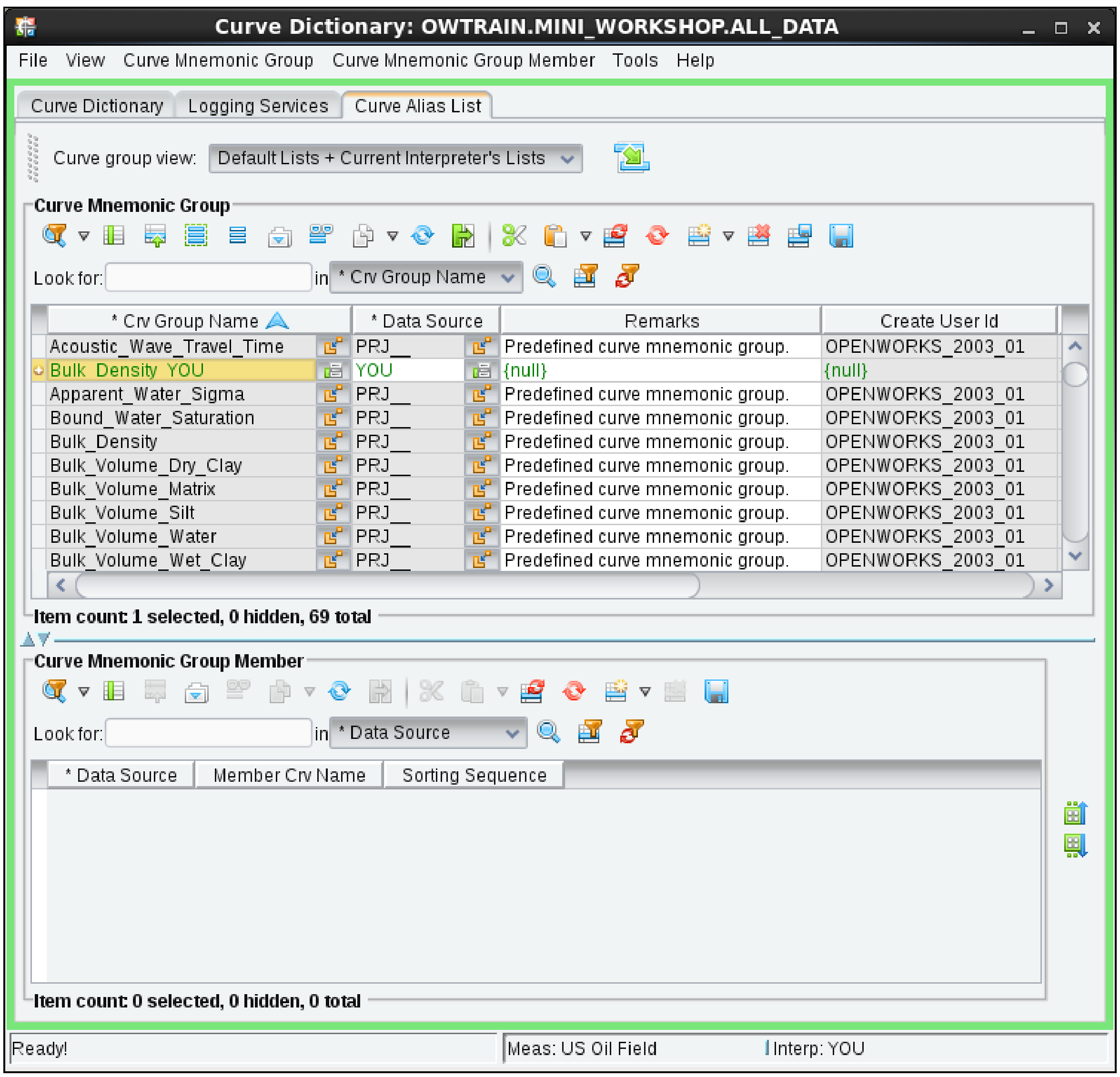
4. Revert all rows back to their original settings.

Exercise 6-3. Creating a New Curve Alias List

In this exercise you will create a new curve group, add curve aliases, and set the curve priority. Your Interpretation ID will own this curve alias group, and it will be available for use by other project users.

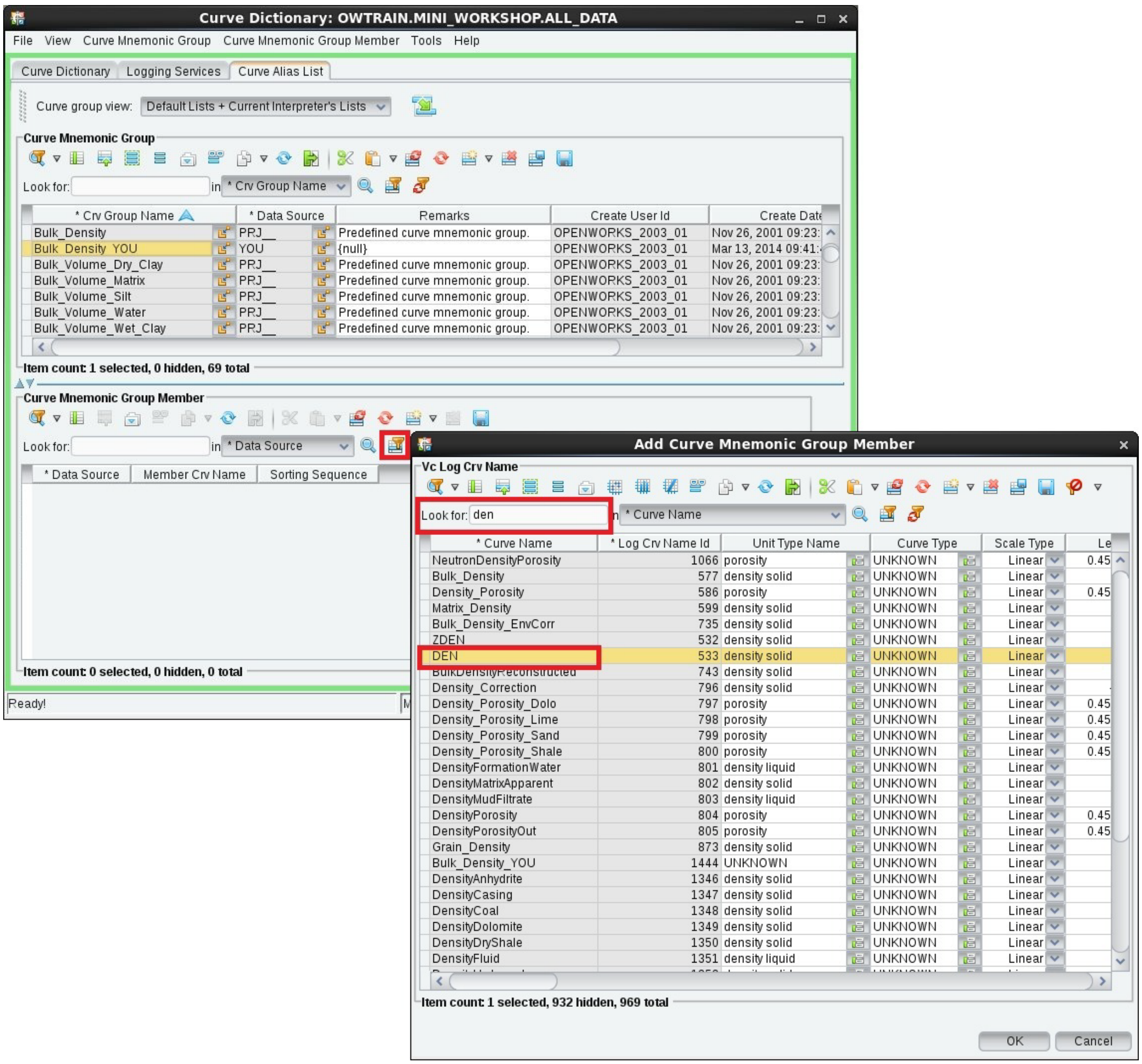
1. In the Curve Alias List Manager, click the **Add New Curve Group**  icon to add a new row to the Curve Mnemonic Group table.

2. In the new row, type **`Bulk_Density_xxx`** for the **Curve Group Name**. The Data Source is automatically set to your session Interpretation ID.



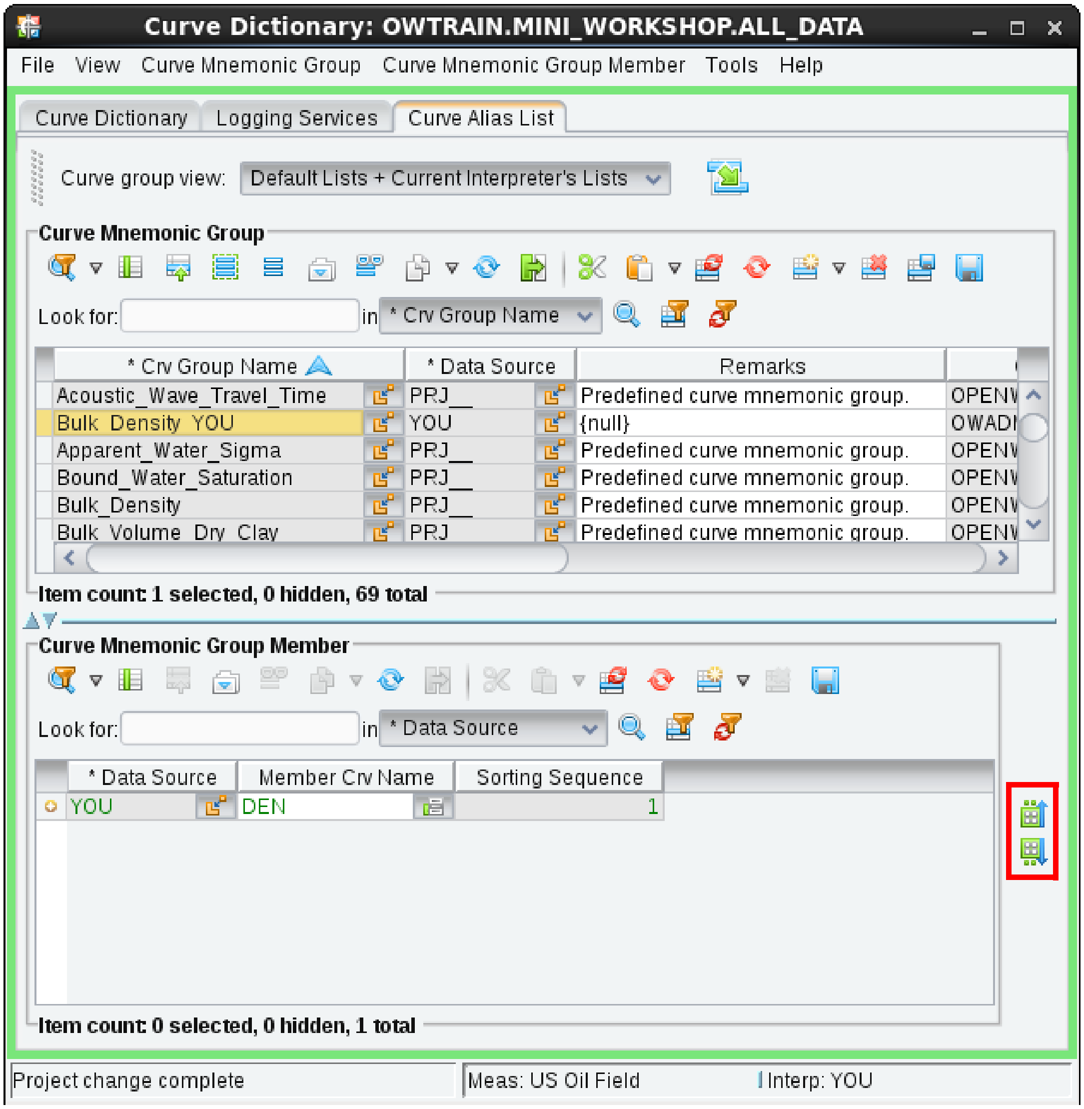
3. Click **Save**.

4. In the toolbar above the Curve Mnemonic Group Member table, click the **Add New Curve Mnemonic Group Member** icon from the Add Curve Group Member window, select the curve alias **DEN**. Use the filter to quickly locate the curve name in the table.



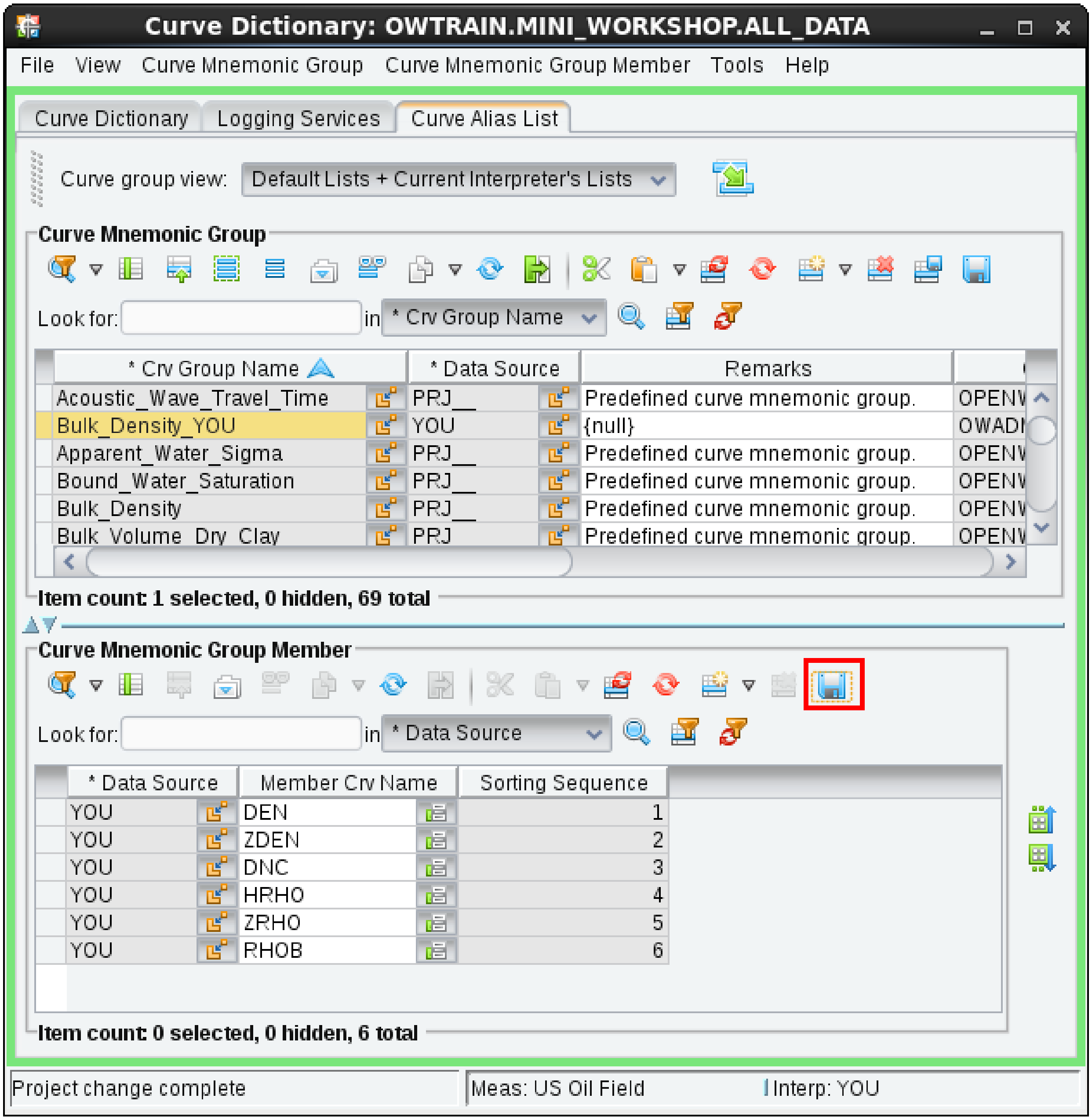
5. Click **OK**.

   A new row appears in the Curve Mnemonic Group Member table with the curve **DEN** and its sort order.



6. Repeat steps 4 and 5 to add these curve aliases to the curve group: **ZDEN**, **DNC**. **HRHO**, **ZRHO**, **RHOB**.

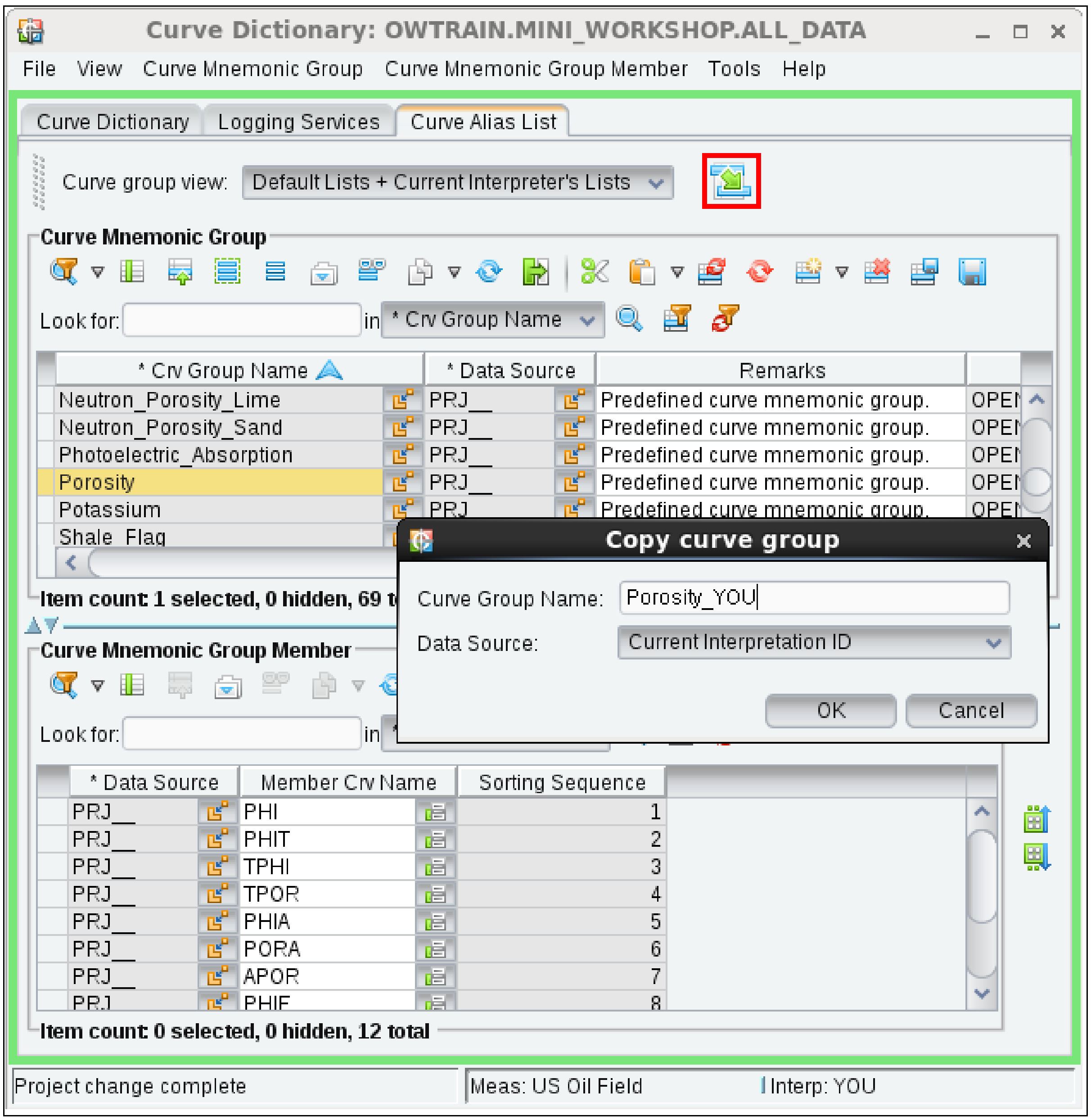
7. Rearrange the sorting sequence of the curve members according to your preference, using the **Move up** or **Move down** buttons. Click **Save** to store the curve alias list to the OpenWorks database.



Exercise 6-4. Copying a Curve Alias List

Another way to create your own curve alias group is demonstrated in this exercise. If an existing curve alias group has most of the features that you want, you can copy that original curve group to a new name and subsequently edit the curve group members.

1. In the Curve Alias List Manager of the Curve Dictionary, select an existing curve group **Porosity** in the Curve Mnemonic Group table. Click the **Copy selected curve group** icon and enter a new name **`Porosity_xxx`** in the **Input** box for the new Curve Group name.



2. Select an item in the **Data Source** drop-down list.

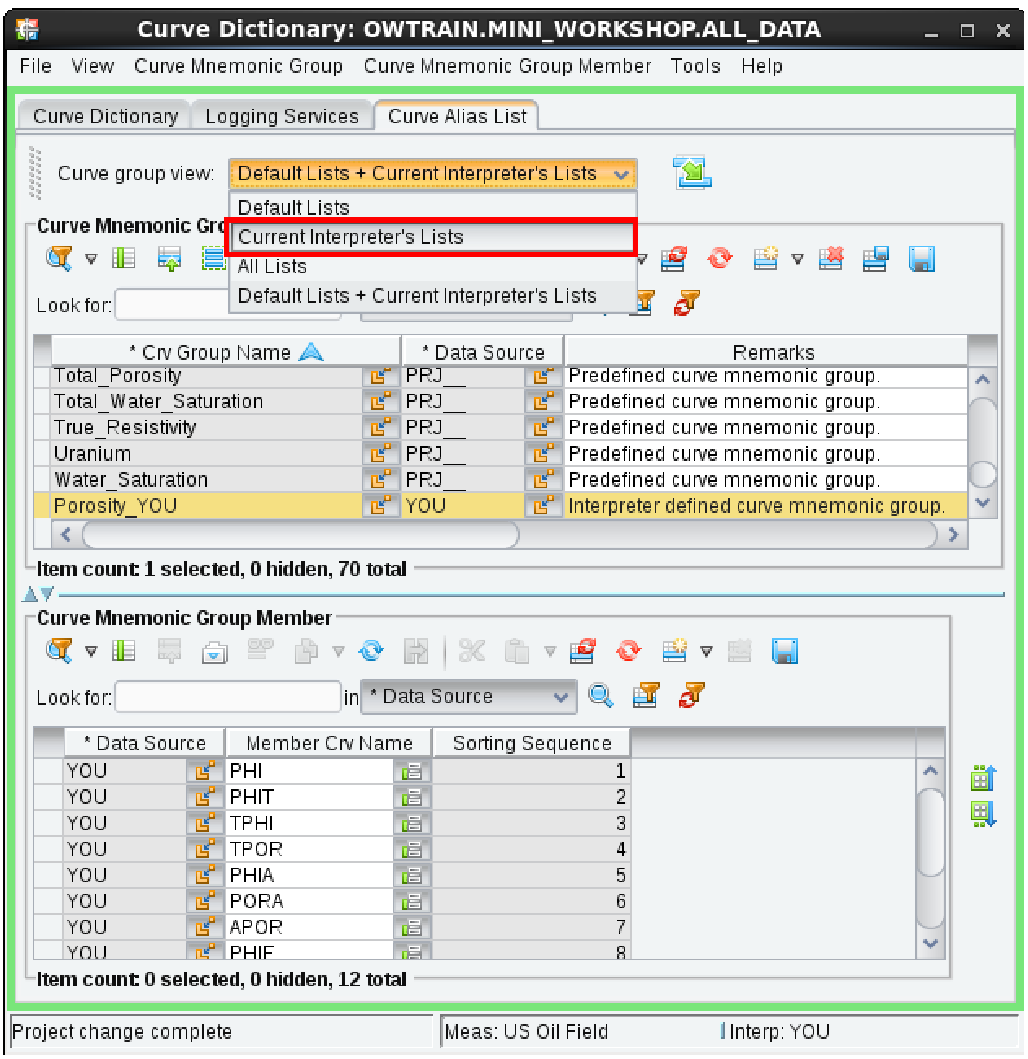
   - The **Project Default** option saves the list with the data source as **PRJ_**. The new curve group list can be viewed in the Default Lists group.

   - **Current Interpreter** saves the list with the data source with which the user has logged into the OpenWorks session. The new curve group list can be viewed in the Current Interpreters group.

3. Click **OK** to create the curve group **Porosity_xxx**.

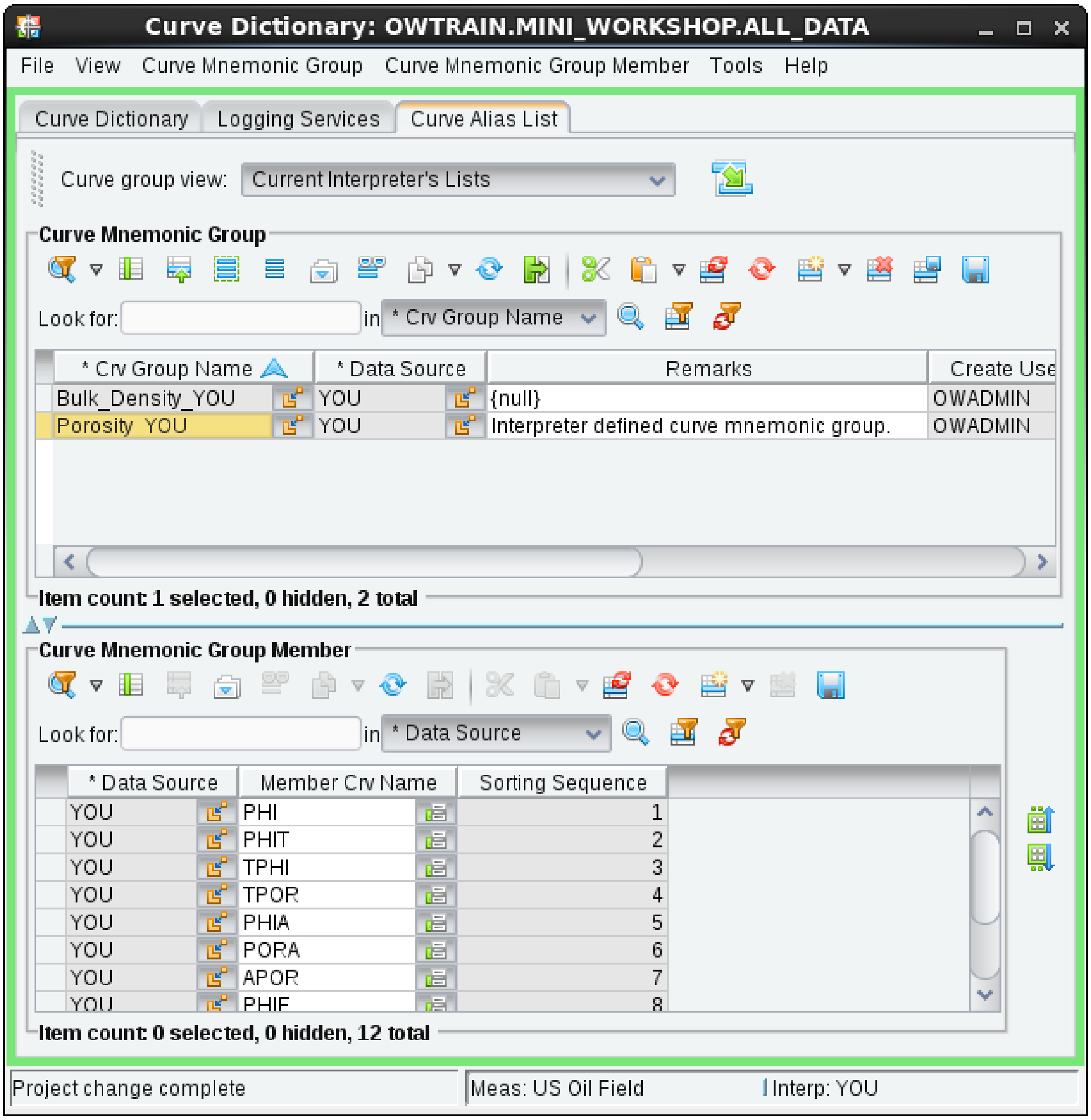
4. Can you find the new curve group name in the table?

   If it does not appear in the listing, you should set the **Curve group view** to either **Current Interpreter's Lists,** or **Default Lists + Current Interpreter's Lists**.



5. Select the copied curve group **Porosity_xxx**.

   Its curve members will be displayed in the child table Curve Mnemonic Group Member. Notice the new curve group has the same 12 curve members as the original curve group.



6. You can add or delete curve members, and modify the sorting sequence using the Move up or Move down buttons.

7. Click **Save.**

8. Exit the Curve Dictionary.

Chapter 7

Loading Binary Curve Data

The OpenWorks software Curve Loader, introduced in Chapter 5, is used to load data in the industry standard LIS, DLIS, BIT, or LAS formats (collectively referred to as *binary* formats). This includes data stored on tape and disk in the TOD or TIF format. Before loading curve data from these industry standard formats, you should describe the data format using a mapping file, so the loader will identify data items and load the data properly.

The Data Import tool offers the capability to import multiple binary curve files in one load job. This utility supports the LIS, DLIS, and LAS formats, and is useful for processing large volumes of data that conform to standard formats

Chapter Objectives

In this lesson you will:

- Scan binary data before loading.
- Load binary LIS, DLIS, and LAS data using the Curve Loader.
- Format and load data using a *.bcl* mapping file.
- Load multiple LAS data files using Data Import.

Understanding Binary Curve Data

As previously mentioned, binary data is stored on tape or disk in a coded format that cannot be directly viewed or edited using a standard text editor. The OpenWorks software supports three binary curve formats:

- **LIS** - the Log Information Standard format developed by Schlumberger
- **DLIS** - the Digital Log Interchange Standard format developed by Schlumberger. This format may contain multidimensional data objects.
- **BIT** - the Bit Scan format developed by Western Atlas

> **Note**
>
> Although LAS curves are in an ASCII format, they are loaded in the same manner as binary curves. LAS is the *Log ASCII Standard* designed by Canadian Well Logging Society for log data on floppy disks.

Binary curve data in either of these formats may be loaded from a locally mounted tape drive, or a network disk. If the media source is a disk file, then you must select the Encapsulation format of that data on the disk. The OpenWorks software provides three Encapsulation formats to choose from:

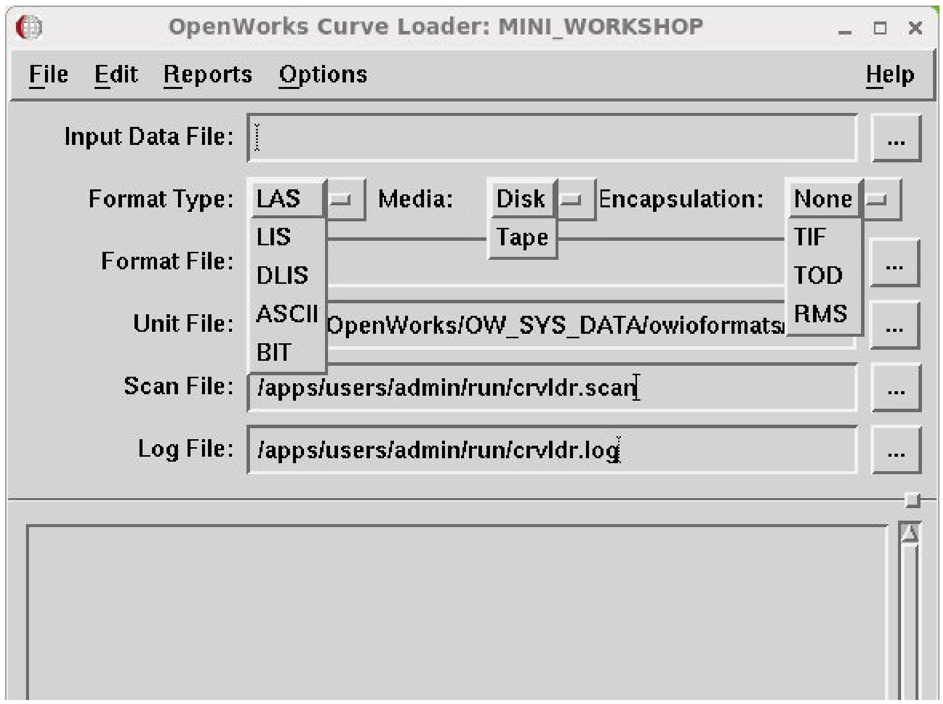
- **None** - no header records display at the top of the input data file
- **TIF** - Schlumberger's tape image format
- **TOD** - Landmark Copy tape-on-disk utility format
- **RMS** - record management system format

> **Note**
>
> Both TOD and TIF preserve the file markers from the tape onto the disk. If the media source is an external device such as a tape drive, it must be locally mounted (directly connected to your workstation).

Scanning and Loading Binary Curve Data

Setting the Input Specifications

Before you can scan and load binary curve data, you must set input specifications to control the data transfer, including the input data format being used, the media, and the encapsulation format.



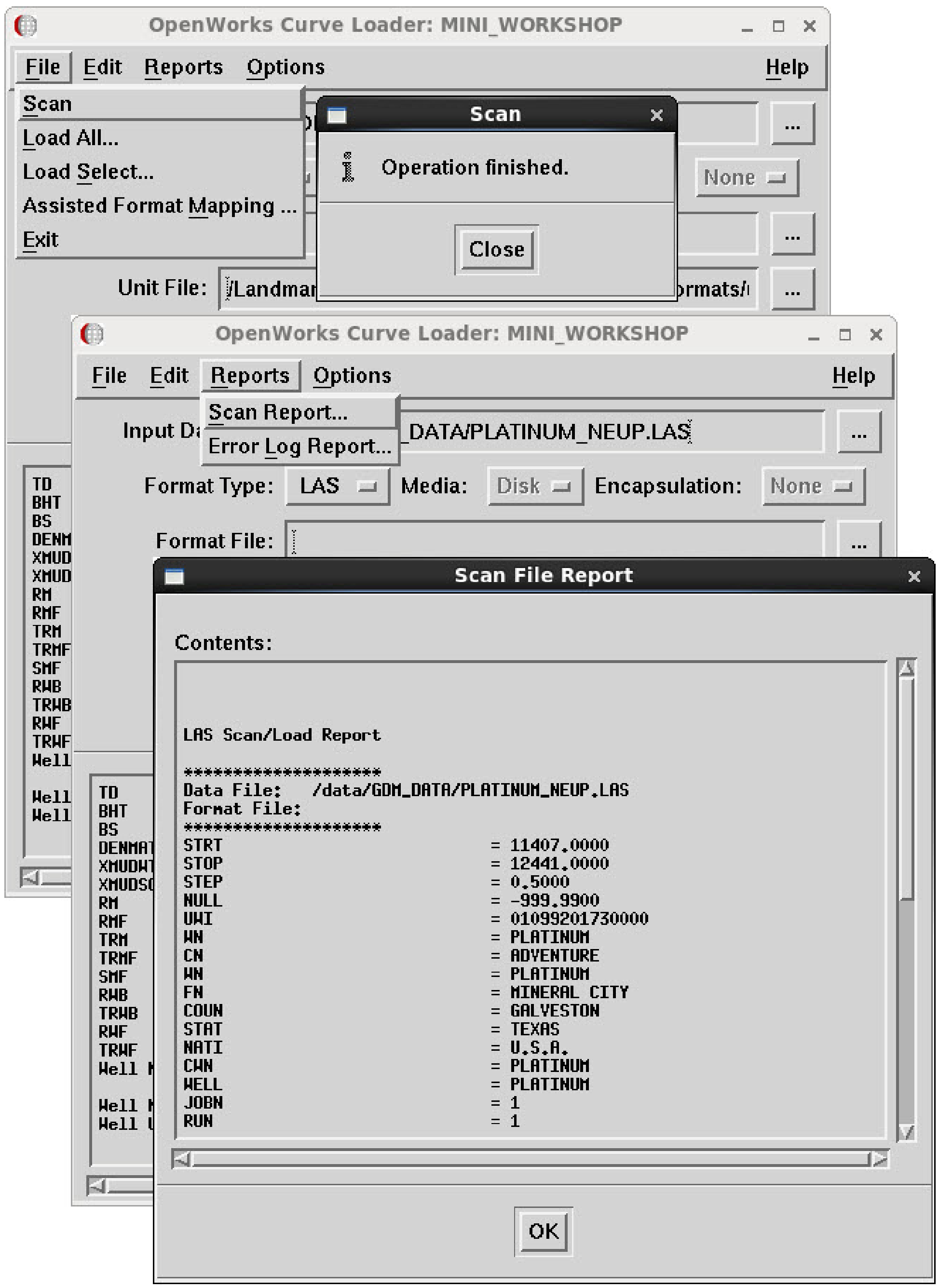
The following table shows valid input specification combinations.

Table 1: Valid Input Specification Combinations

Format Type	Media	Encapsulation
LAS	None	None
LIS	Disk	TOD, TIF, or None
LIS	Tape	None
DLIS	Disk	None
DLIS	Tape	None
BIT	Disk	TOD or None
BIT	Tape	None

Scanning the Data

Once your input specifications are set, you are ready to scan the tape or disk file. Scanning does not load the data into the database, but it does move well names and curve types into a work area where you can view and edit them. Select **File > Scan**. Scan results are written to the bottom of the Curve Loader window, the Scan Report, and any selected Scan File. Scanning is needed to active **File > Load Select**, but not **File > Load All**.

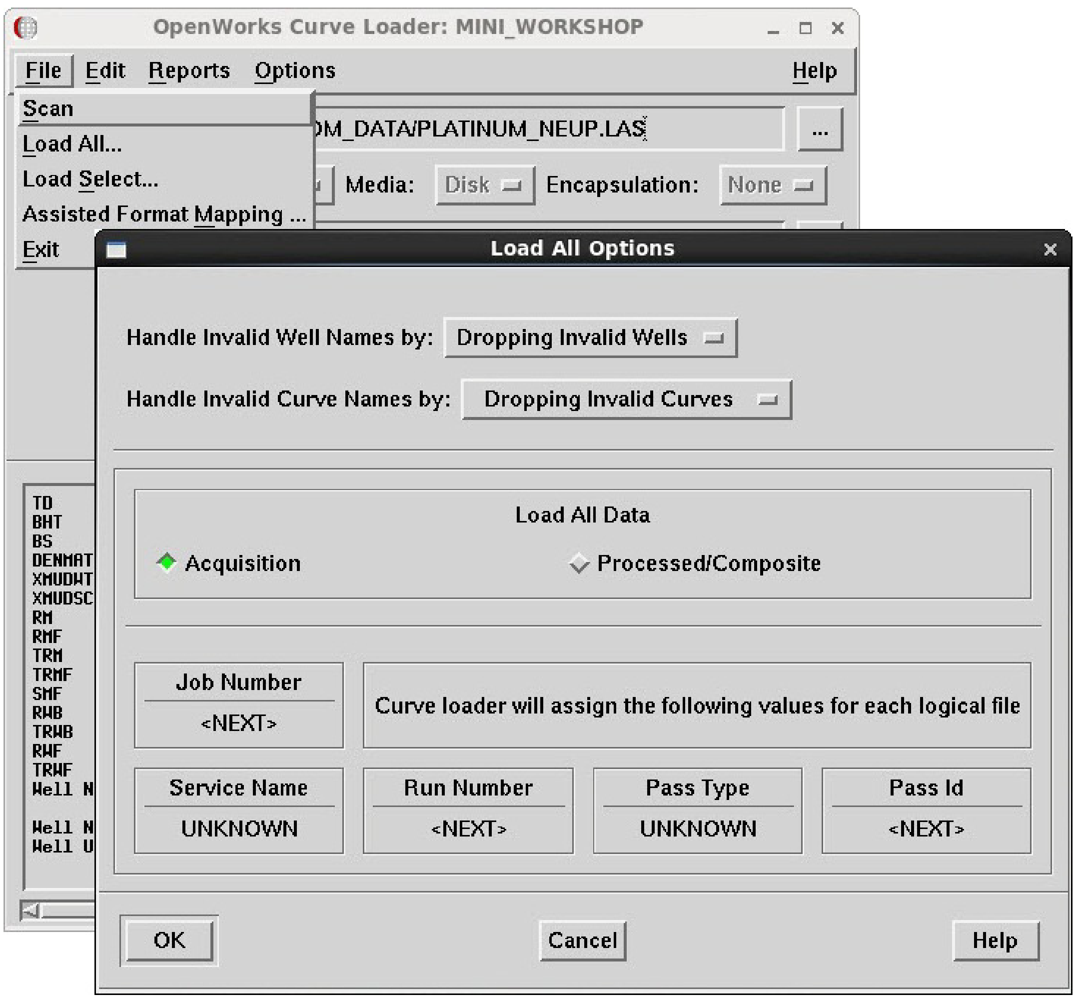


If you do not select the proper encapsulation, the scan may fail.

Loading the Data

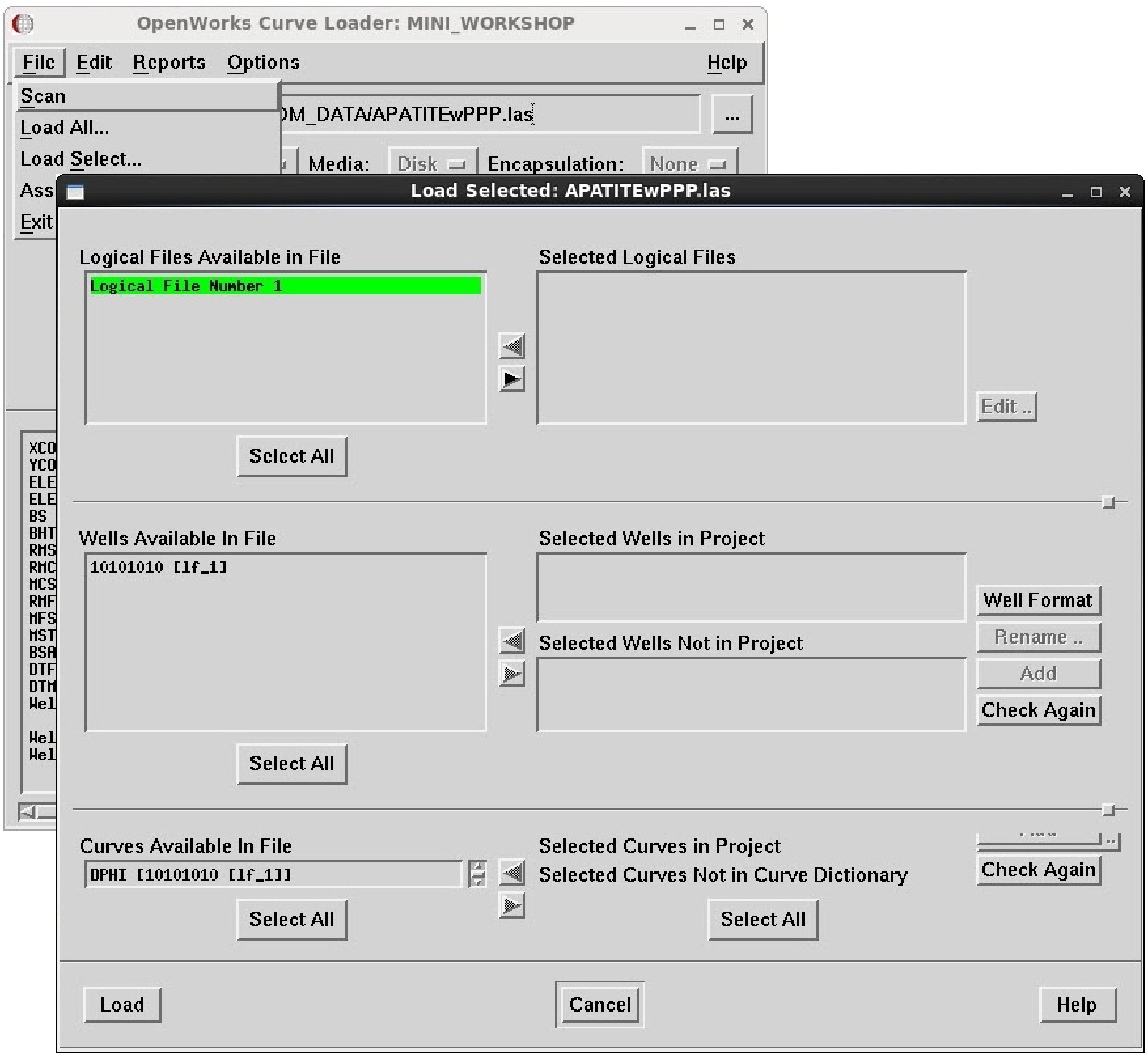
Once your inputs are selected and scanned, you are ready to load your data. From the Curve Loader menu bar, select either **File > Load All** or **File > Load Select**. These options work just as they did for loading ASCII curve data in Chapter 5.

- If you **Load All**, you have the choice of dropping all invalid wells and curves, or adding them to the project. You also have the choice of Acquisition or Processed/Composite data.



> **Note**
>
> Some fields cannot be accessed for loading. Notice that you cannot select **Job Number**, **Service Name**, **Run Number**, **Pass Type,** or **Pass Id** in the **Load All** dialog box. **Load Select**, discussed subsequently, does allow selection of these values.

- If you **Load Select**, you can select the wells and curves from the input file that you actually want to load into the database.



Exercise 7-1. Loading Binary Curve Data (LIS Format)

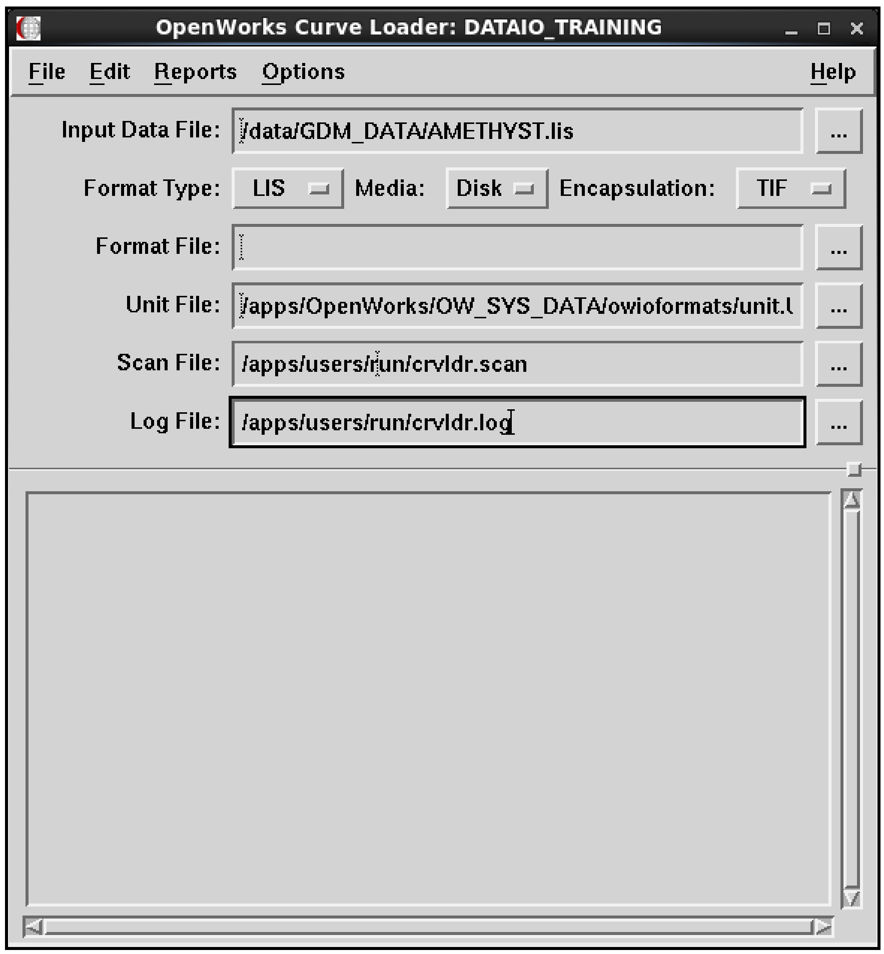
1. Change your OpenWorks project to **DATAIO_TRAINING**.

2. Set an interpreter.

3. Access the Curve Loader from the OpenWorks command menu by selecting **Data > Import > Curve Import (Classic)**.

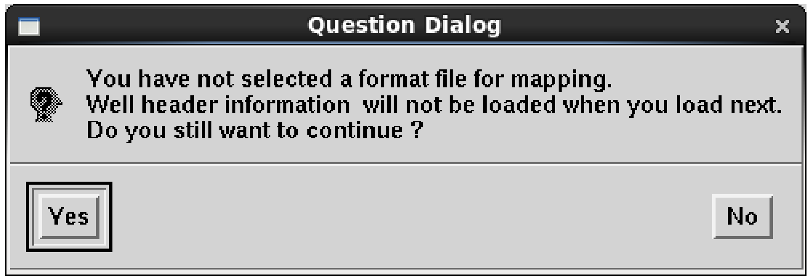
4. Set the Format Type to **LIS** in the Curve Loader window.

5. Select **AMETHYST.lis** as the Input Data File, the Media to **Disk**, and the Encapsulation to **TIF**.

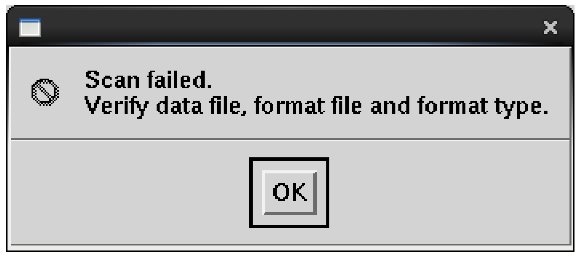


6. Select **File** from the Curve Loader menu. Notice that the Load Select option is not available. Load Select becomes available after scanning a file.

7. Select **File > Scan** from the Curve Loader window. A dialog box displays indicating that you did not select a format file for mapping. You use a format file in a later exercise. Click **Yes**.



Your scan fails. Why did this happen?



8. Recall the format type, media, and encapsulation combinations provided in Table 1, “Valid Input Specification Combinations,” on page 7-3. Is the combination here valid?

9. Change Encapsulation to **None**. Select **File > Scan**. Click **Yes** to allow the scan to continue without a format file.

> **Note**
>
> Notice that the unit file defaults to unit.UNIT. If no unit file is selected, you will be prompted to select one. Specifying a unit mapping file when loading data helps ensure that your data enters the OpenWorks database with the correct units.

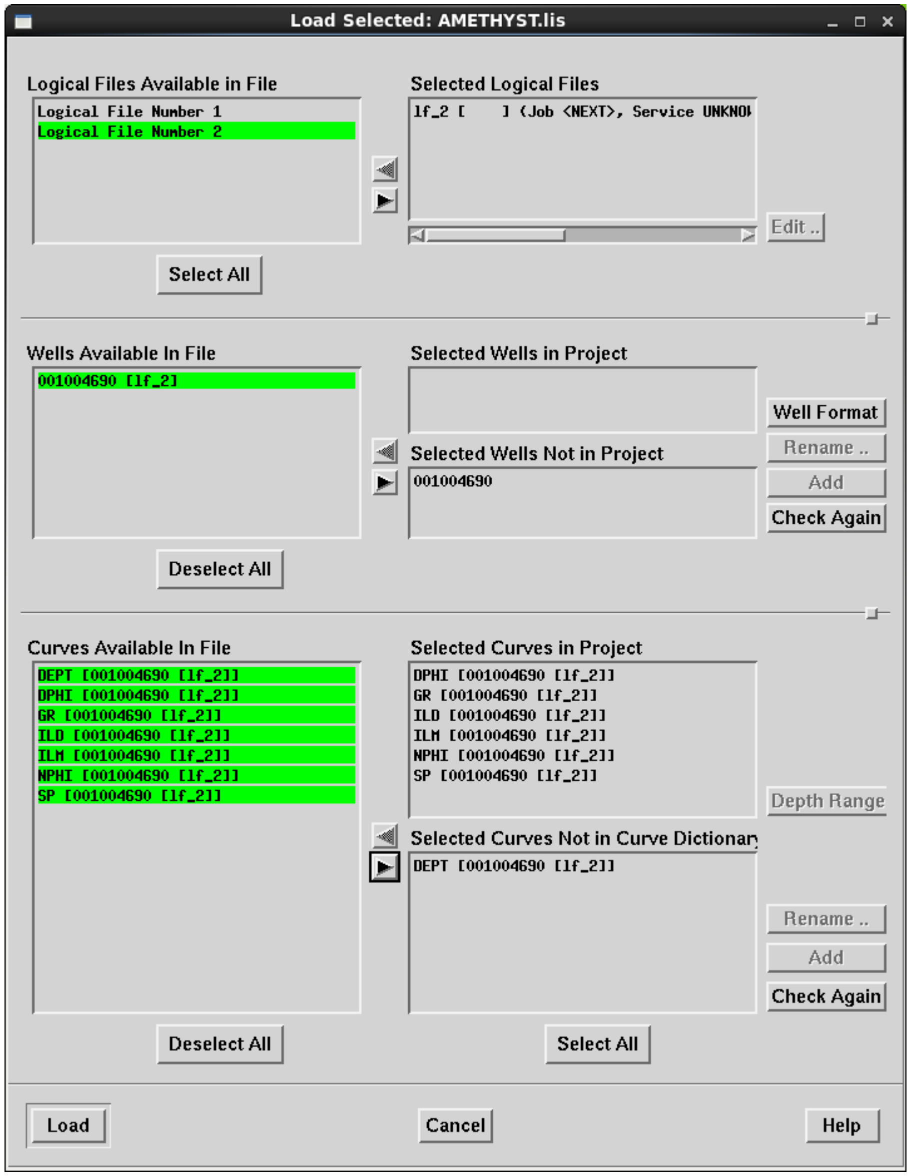
10. Load Select is now active and allows you to select wells, logical file units, and curves from your input file. Select **File > Load Select** from the Curve Loader menu.

11. Under Logical Files Available in File, highlight **Logical File Number 2**, and click the arrow to move it to the Selected Logical Files side of the Load Selected window.

12. Under Wells Available In File, highlight **001004690 [lf_2]**. Click the arrow to move this well from the Available to the Selected side of the Load Selected window.

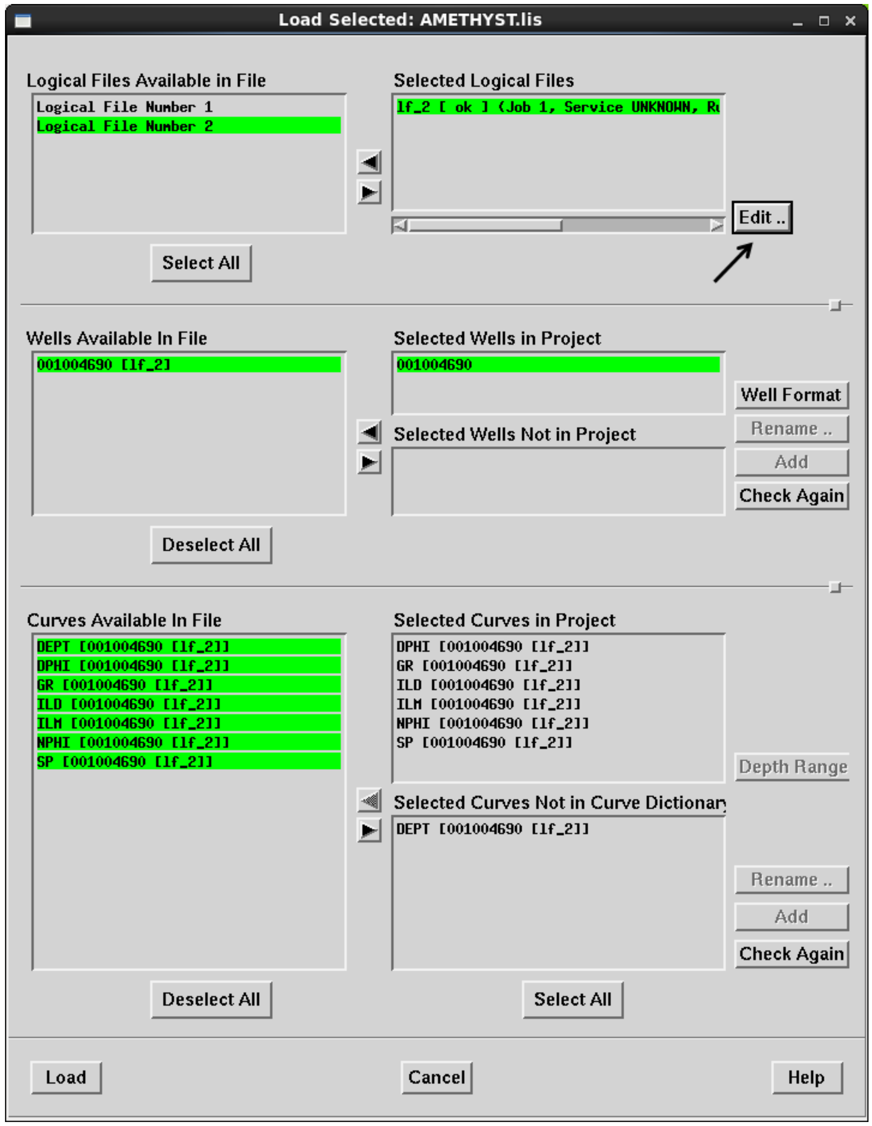
13. Under Curves Available In File, highlight all curves using the **Select All** button. Click the arrow to move these curves to the Selected side of the Load Selected window.

14. Notice that the selected well is not in the project. Highlight the well **001004690** and click **Add**. The well is added to the project.



Notice also that there is one curve that is not in the dictionary; you are not loading this curve to the project.

15. Select **lf_2** from Selected Logical Files and click **Edit**.



Set the following parameters:

- Select the **Acquisition** Edit Curve Identifier.
- Toggle ON **Make New Job**.
- Set the Service Name to **DIL/LDT/CNL/GR**.
- Set the New Run Number to **1**.
- Set Pass Type to **Main/Primary**.
- Set Pass ID to **Main**.
- Click **OK**.

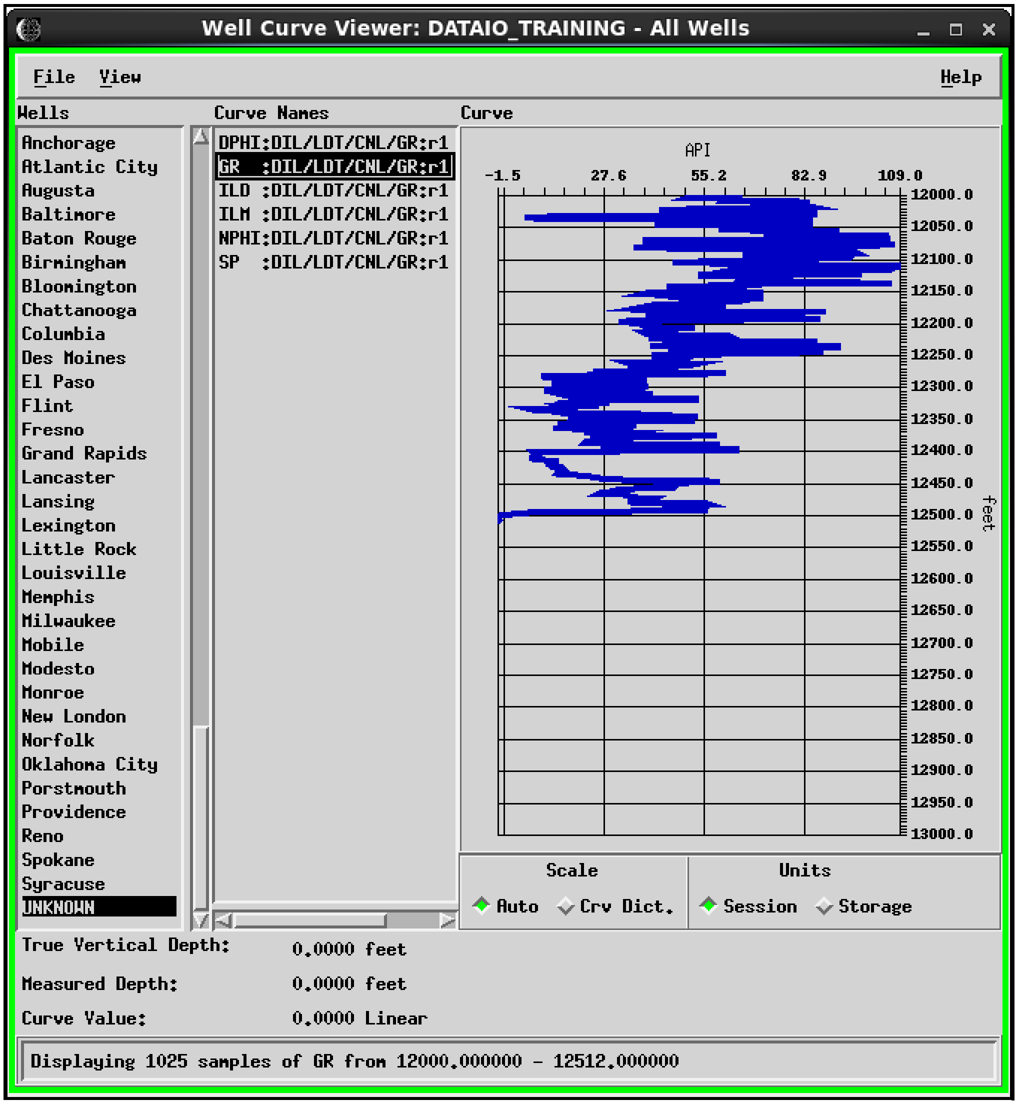
> **Note**
>
> Notice that the only curves available are curves from the selected Logical File. If you select **Logical File Number 1**, a different set of curves are available.

16. Click **Load** in the Load Selected window.

17. When the load is complete, click **Close** to dismiss the message and click **Close** to close the Load Selected window.

18. Open the Well Curve Viewer. When the Well Curve Viewer window displays, select **File > Read All**, and highlight **UNKNOWN** from the resulting list.

    Display curves GR and ILD.



Use the Curve Dictionary to verify/change the display defaults as follows.

	GR	**ILD**
Scale Type	Linear	Log
Left Scale Storage	0.0	0.2
Right Scale Storage	120.0	2000.0

Note

The well is UNKNOWN because you added it to your project during the curve load. You can edit the Common Well Name and other features of the well using Well Data Manager.

19. Exit the Curve Loader, Well Curve Viewer, and Curve Dictionary.

Using Mapping Files with LAS/LIS/DLIS Data Files

Before loading curve data from the industry standard formats DLIS, LIS, LAS, and BIT (here collectively referred to as “binary” formats), you should describe the format of the data so that the loader will appropriately identify the different data items and load the data properly.

You describe the format of the data using a mapping file. The mapping file is the link between the data and the loader: it defines how the data is loaded into the OpenWorks database.

Landmark supplies a number of “binary” Curve Loader (.bcl) mapping files. For more information on these mapping files, refer to the OpenWorks Data Import/Export manual. Alternatively, you can create new mapping files.

Understanding .bcl Mapping Files

The *tiny.bcl* file displayed below contains all possible types of *.bcl* file entries, well information mappings, petrophysical parameter data mappings, and special keywords. The actual *tiny.bcl* text file is shown below (with headers added for clarity):

tiny.bcl text file

Export File Mnemonic	[reserved columns]		OpenWorks Data Item	OpenWorks Data Category	OpenWorks Petro Parm
WN	0	0	Well Name	Well Header	
ELEV	0	0	Elevation	Well Header	
BS	0	0		Petrophysical Parm Value	BitSize
#DOALL	0	0		Petrophysical Parm Value	
#DOALL	0	0		Logging Tool Config	
$LONG-NAME	0	0		Petrophysical Parm Value	Remark

Row data is tab delimited. The columns containing zeros are reserved for future use; the zeros are place holders. You can create and edit *.bcl* files with a text editor, but using the Binary Mapping File Editor ensures that you are working with proper OpenWorks Data Categories, Data Items, and Petrophysical Parameter entries.

> **Note**
>
> You should be able to edit all *.bcl* files with Curve Loader's Binary Format Editor or Assisted Format Mapping utility or with Well Data Export's Binary Mapping File Editor. If you do edit a `.bcl` text file in a text editor, be aware that rows must be tab delimited and that you must include the reserved columns with the zero (0) placeholders.

In Curve Loader's Binary Format Editor, the *tiny.bcl* file displays like this:

Defined Mnemonic	Data Category	Data Item	Target Name
WN	Well Header	Well Name	
ELEV	Well Header	Elevation	
BS	Petrophysical Parm Value		BitSize
#DOALL	Petrophysical Parm Value		
#DOALL	Logging Tool Config		
$LONG-NAME	Petrophysical Parm Value		

The columns are:

- **Defined Mnemonic** – The label for a piece of data in the input file
- **Data Category** – OpenWorks table name where data will be loaded
- **Data Item** – Name of the table field where data will be placed
- **Target Name** – Used only for petrophysical parameters; specifies the OpenWorks storage name for the loaded parameter

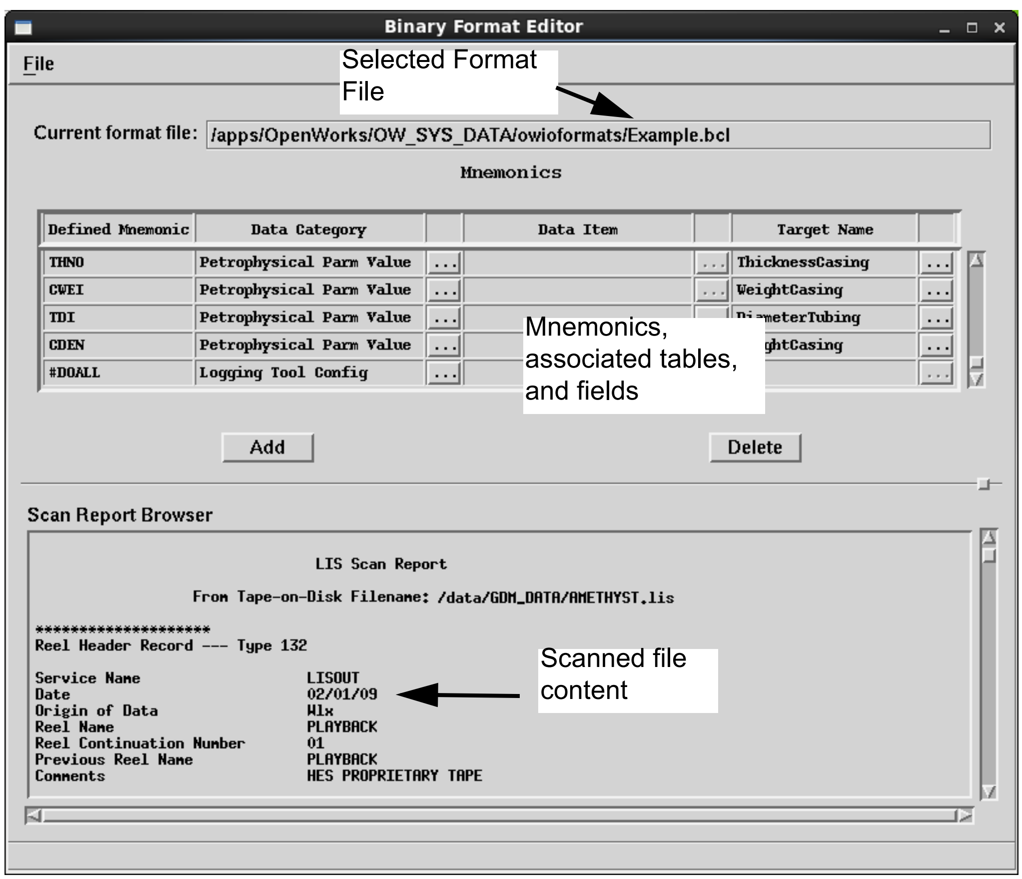
> **Notes**
>
> - Special *$* keywords are used in conjunction with the Petrophysical Parm Data Category. To understand the function of these keywords, you need to understand that petrophysical parameters are generally set up in DLIS and LIS files as objects that usually have name/value pairs.Parameter attribute keywords beginning with the $ character are used by Curve Loader but are currently ignored by Well Data Exporter.
> - When a *.bcl* file contains the *#DOAL*L keyword and a mnemonic explicitly mapped to a Target Name, all petrophysical parameters, including all explicitly mapped mnemonics, are loaded with their parameter names unchanged. In addition, any explicitly mapped mnemonics are mapped to the Target Name. It does not matter where in the sequence the #DOALL row displays.
> - LIS files should contain long and short names for each parameter. If no short name exists, then the parameter is dropped upon load. Assisted Format Mapping, discussed subsequently, can be used to map long names to short names. Short names have a maximum of four characters.

Although the same *.bcl* file can be used both for loading and for exporting data, the roles of the mnemonics are reversed: Curve Loader uses mnemonics for loading to database; whereas exporter uses them for exporting to a file.

When a *.bcl* file includes several mnemonics that map to the same Data Category and Data Item, Curve Loader loads the mnemonics and their values into the same field in the database. The first value is overwritten by the second, the second by the third, and so on. Only the value of last mnemonic that maps to the Data Category: Data Item in the *.bcl* file is saved to the database. When a *.bcl* file maps a single mnemonic to several different Target Names, Target Names will be created as necessary and loaded with the value of the mnemonic.

Creating or Editing a "Binary" Format File

If a previously defined format does not describe your input file, you must create a new format or edit an existing format. You use the Curve Format Editor to create a new format or to edit an existing format. To start the Curve Format Editor from the OpenWorks Curve Loader, select **Edit** > **BCL Format**. The Binary Format Editor window opens.



If you have selected a format file, the current format file contents display. If you have scanned a data file, the file contents display in the Scan Report Browser area. Otherwise, the Binary Format Editor is empty.

This utility allows you to map a data file mnemonic, or data item label, to a data item in the OpenWorks database. You can create new format files or open and modify existing format files.

The Curve Format Editor has two main areas:

- The File Mnemonics section of the window displays the current format file path and name, the format file's mnemonics, the OpenWorks data table and field each mnemonic will map to, and buttons that allow you to add or delete OpenWorks data to be associated with the mnemonics.

- The Scan Report Browser section of the window allows you to browse the scanned data file contents to look for mnemonics to map.

Exercise 7-2. Creating a Binary Format File (LIS)

In this exercise you format a mapping file and use it to load binary curve data.

1. In the OpenWorks Curve Loader dialog box, select **LIS** as your Format Type.

2. Select **TOPAZ.lis** as your Input Data File.

   Do not select a Format File.

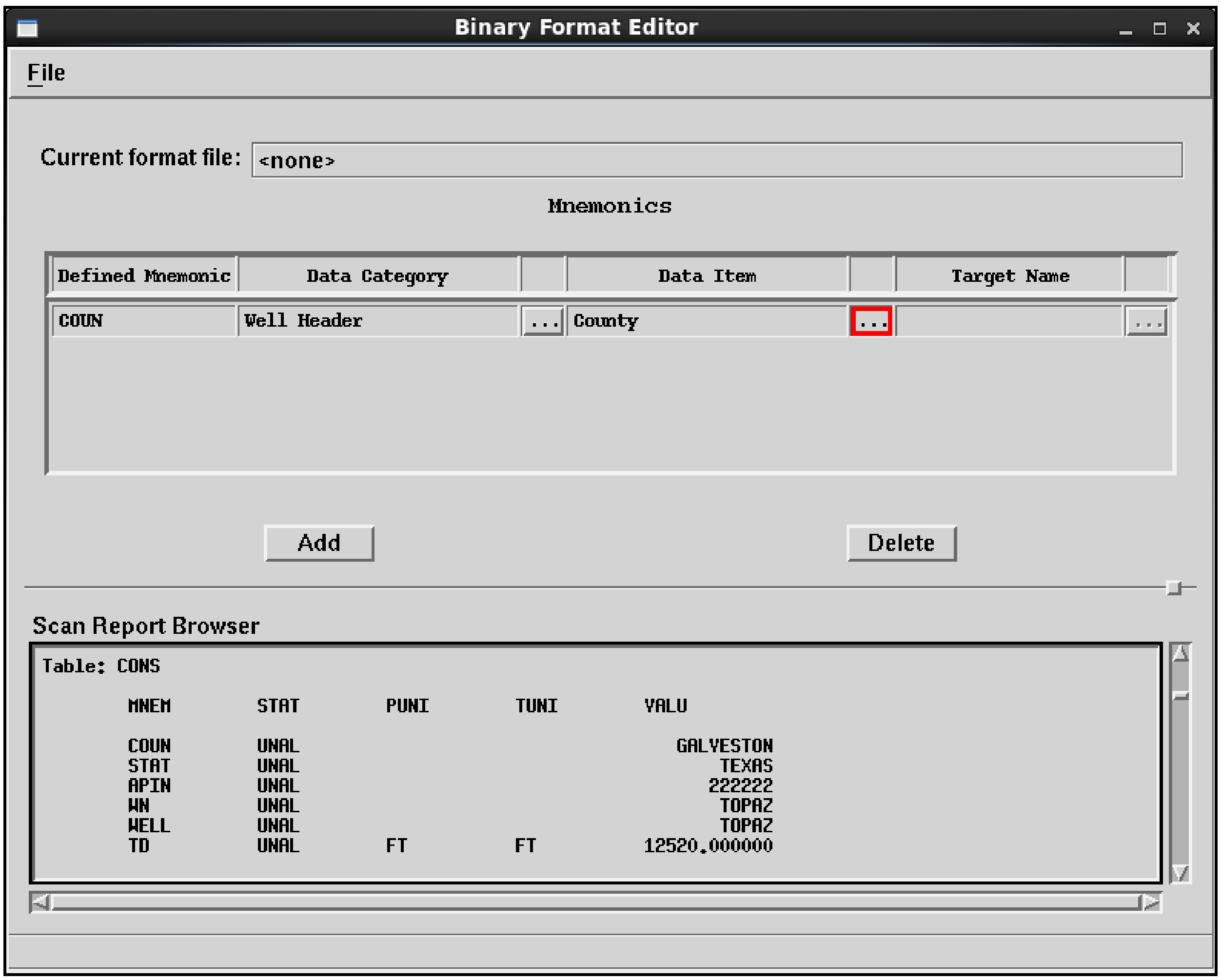
3. Select **File > Scan**. A Question dialog box displays asking you to confirm that you do not wish to use a mapping file. Click **Yes** to continue. Results of the scan are written at the bottom of the Curve Loader dialog box. Review the results of the scan to identify mnemonics for mapping.

```
********************
Information Record --- Type 34

Table: CONS

        MNEM        STAT        PUNI        TUNI        VALU

        COUN        UNAL                                     GALVESTON
        STAT        UNAL                                         TEXAS
        APIN        UNAL                                        222222
        WN          UNAL                                         TOPAZ
        WELL        UNAL                                         TOPAZ
        TD          UNAL        FT          FT          12520.000000

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

********************
Information Record --- Type 34
```

4. Select **Edit > BCL Format** to create your format mapping file. The Binary Format Editor is displayed. Notice that the results of your scan are located in the bottom of the Binary Format Editor. Review your scanned file and locate the mnemonics in the window below. Note that the length of the mnemonics in the LIS file is limited to four characters.

5. Define the COUN mnemonic in your format file.

   - Click **Add** in the Binary Format Editor.
   - Type **COUN** into the **Defined Mnemonic** column.
   - Select the ellipsis (**...**) button (located in the Data Category column) and select **Well Header**. Click **Apply**, and then click **Done** to close the dialog box.
   - Select the ellipsis (**...**) button (located in the Data Item column), and then select **County**. Click **Apply** and then click **Done** to close the dialog box.



Note

If the Data Category entry is not Petrophysical Parm Value, the ellipsis button after the Data Item column is active. The title of the dialog box as well as the available fields depend on the Data Category you select.

6. Repeat the steps above for the following mnemonics.

Defined Mnemonic	Data Category	Data Item/Target Name
WELL	Well Header	Common Well Name
STAT	Well Header	State
TD	Well Header	Total Depth

7. Select **File > Save As**. Name the format file `MINERAL_WELLS.bcl` and click **OK**.

Notes

If the Data Category entry is Petrophysical Parm Value, the ellipsis button after the Target Name field is active only if the following are true:

- The mnemonic is not #DOALL.
- The mnemonic does not start with the $ character.

If the petrophysical parameter you want to map to does not display in the table, you can do one of the following:

- Type the name for the petrophysical parameter in the Selection field, then click **Apply**.
- Type the name in the Target Name field in the main Editor window, then press the **Return** key.

The name is added to the OpenWorks Petrophysical Parameters table. After you load petrophysical parameters, you can view them in Well Data Manager using the Petrophysical Parms Data Form.

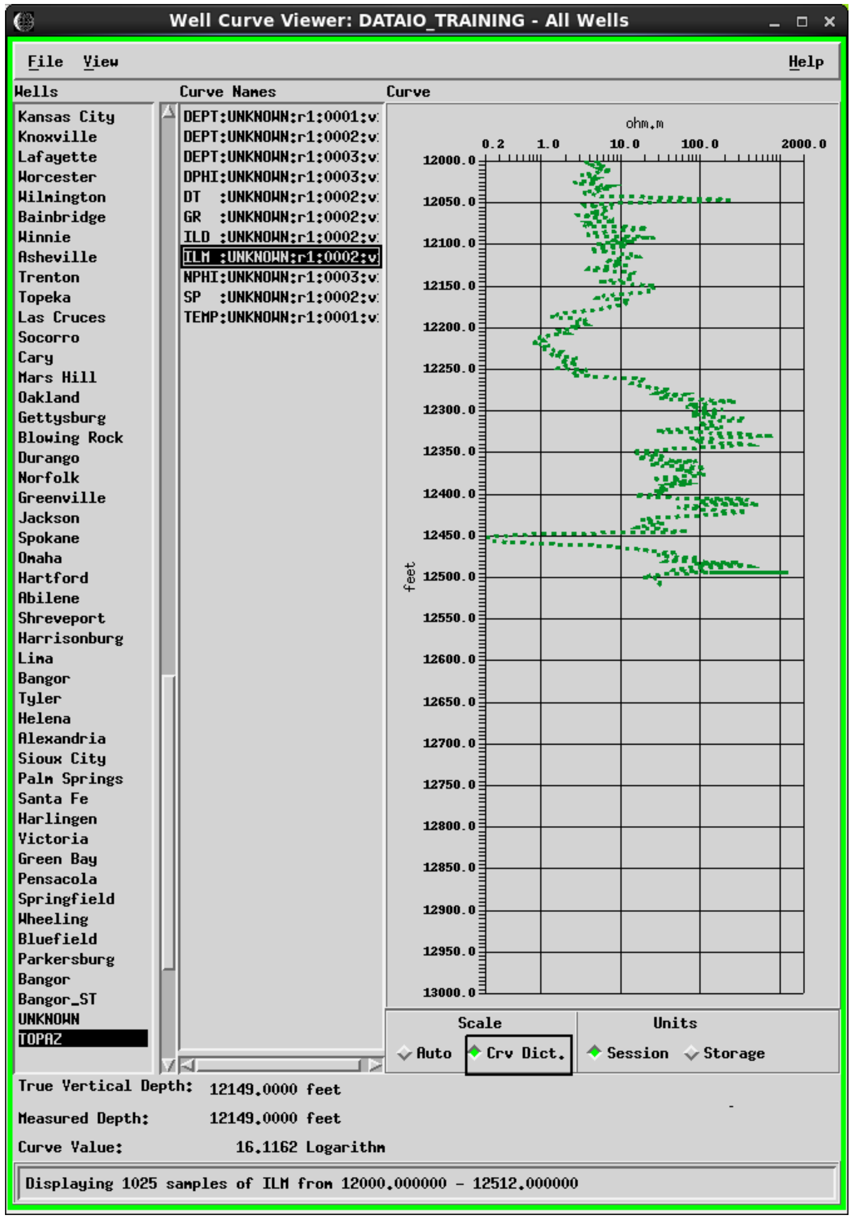
8. Select **File > Close** to exit the Binary Format Editor.

9. In the OpenWorks Curve Loader window, select `MINERAL_WELLS.bcl` as your Format File.

10. Select **File > Load All**. Handle Invalid Well Names by **Creating Well Instances** and Handle Invalid Curve Names by **Adding to Curve Dictionary**. Load All Data as **Acquisition**. Click **OK** to begin loading the data.

    If the Confirmation dialog box displays, ensure that **Update None** and **Do not show this dialog box again** are toggled ON. Click **Continue**.

11. Select **Data > Management > Well Curve Viewer** and verify that the curves were loaded for the TOPAZ well. Your Well Curve Viewer dialog box should look similar to the one below.



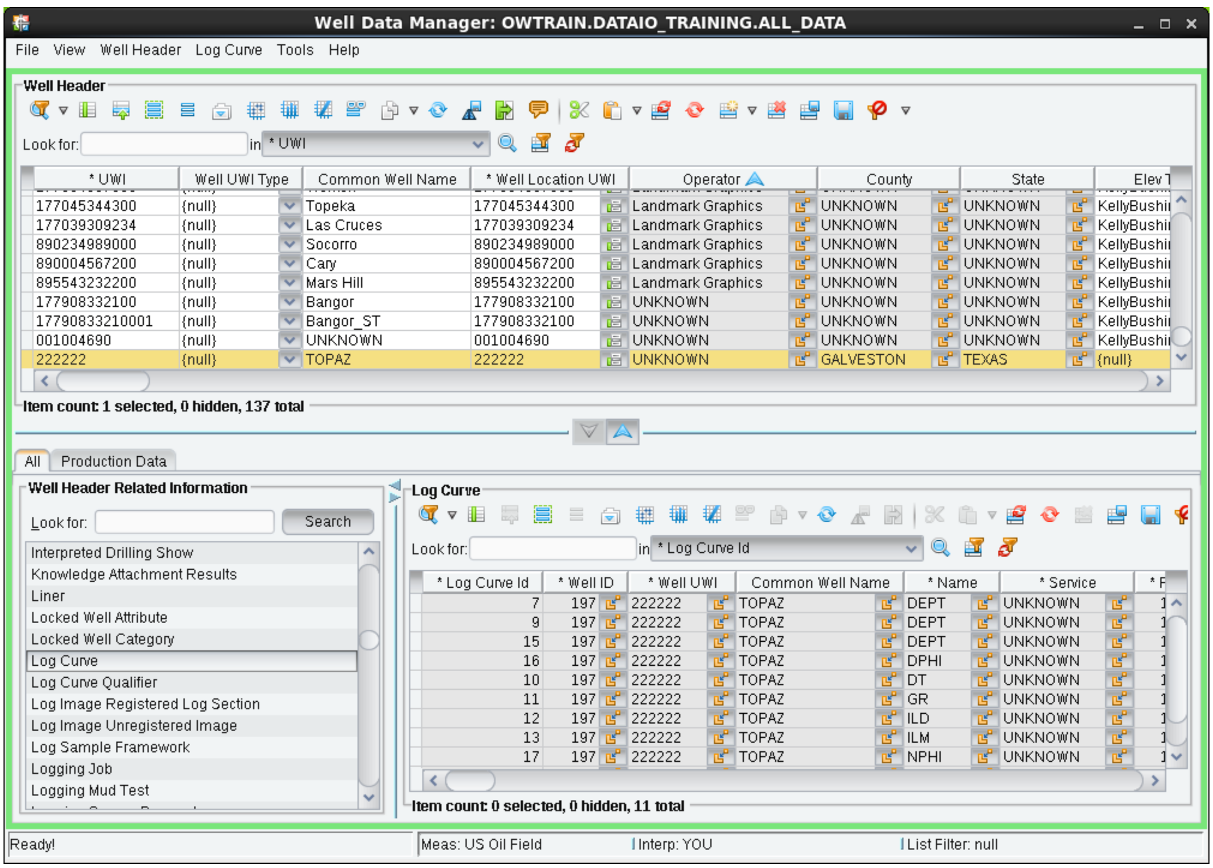
Note that the Service Name for these curves has defaulted to UNKNOWN. The Run Number for all curves in the load is the same. In the example above, the Run Number is 1. The Pass Type is determined by the Logical File containing the data. Logical File 1 has a Pass Type of 0001, Logical File 2 has a Pass Type of 0002, and Logical File 3 has a Pass Type of 0003.

From this you know that each Logical File contained the following entries:

- lf_1 (DEPT, TEMP)
- lf_3 (DEPT, NPHI, DPHI)
- lf_2 (DEPT, DT, GR, ILD, ILM, SP)

12. Now view the parameters you mapped in the Well Data Manager.

- Select **Data > Management > Well Data Manager**.
- Select **All Well Header**.
- Locate the **TOPAZ** well and the see the Log Curves information.
- Scan through the data form to view the data items you just loaded.



The County, State, Common Well Name, and Total Depth data items were loaded as part of the LIS curve data file.

> **Note**
>
> In order to display log curves in StratWorks software Single Well Viewer, Total Depth information is required in the Well Header table.

Using Assisted Format Mapping

Assisted Format Mapping (AFM) is a utility that allows you to create a custom data format (*.bcl* file) that is best suited for a given LAS, LIS, or DLIS file. (The AFM utility is not available for ASCII formatted files.) After scanning the data file, you use AFM to display the following information in the data file:

- Well header information mnemonics
- Petrophysical parameter mnemonics
- Parameter attribute mnemonics
- Tools
- Equipment

You can then map these mnemonics to appropriate OpenWorks database fields and save these mappings to a *.bcl* file. This way, you can capture most or all the mnemonics present in the scanned data file without loading the file contents beforehand. AFM is also useful when you are loading several data sets that have same mnemonics. The *.bcl* file you create with AFM can be used like any other *.bcl* file.

If you select a *.bcl* file in the main Curve Loader window before scanning the input data, then you open AFM, the utility displays some mnemonics as already selected and mapped. These are exactly the mnemonics that are present in the selected *.bcl* file, and they are mapped exactly the same way as in the *.bcl* file. Thus, AFM allows you to augment the current *.bcl* file or to override mappings in it. AFM does not allow you to add or delete mnemonic entries. Use the Binary Format Editor to add or delete lines from the *.bcl* file.

After you have created or edited and saved a *.bcl* file within AFM, you can select the new *.bcl* file name in Curve Loader's main window (Format/Mapping file field) and load data using the "Load All" or "Load Select" option. You do not need to rescan the data. However, you may want to rescan the data and open AFM utility again to ascertain that the new mappings are indeed applied in the new *.bcl* file.

The following diagram shows the relationship of data file, *.bcl* file, and AFM.

Scanned Data File

```
WN        = GARDEN
LATI      = 50.000000
LONG      = -5.000000
BS        = 12.250000
BHT       = 204.000000
```

2. When you open AFM, it checks data file mnemonics for mnemonics defined in the selected .bcl format file.

Selected .bcl Format File

Mnemonic	OW Data Category	OW Data Item	Target Name
WN	Well Header	Well Name	
LATI	Well Header	Latitude	
ELEV	Well Header	Elevation	
BS	Petro Parm Value		BitSize

Assisted Format Mapping Utility

Well Information Mapping

	Mnemonic	OW Table	OW Field
☑	WN	Well Header	Well Name
☑	LATI	Well Header	Latitude
☐	LONG		
☐	BS		
☐	BHT		

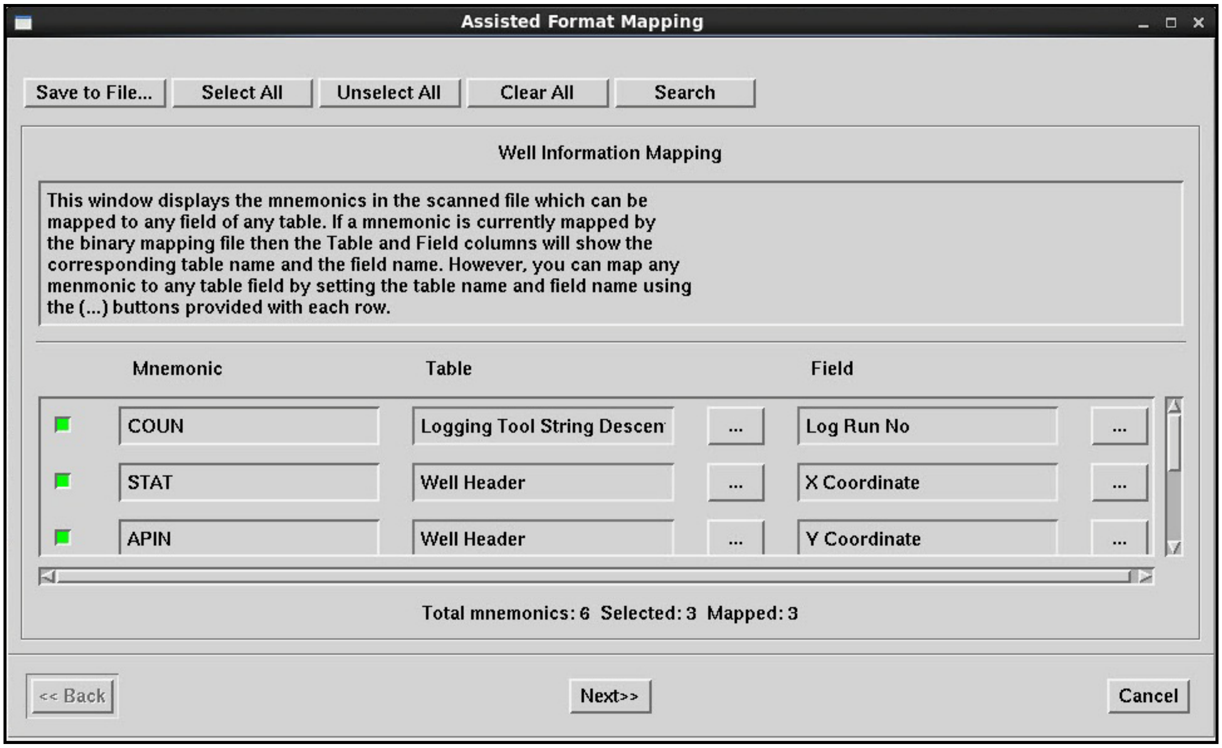
Petrophysical Parameter Mapping

	Parameter	Description	Target name
☑	BS	BitSize	BitSize
☐	BHT	BottomHoleTemperature	

3. Assisted Format Mapping utility panes display all the data file mnemonics and indicate with checkmarks which mnemonics are mapped by the .bcl file. You can toggle on the checkboxes for unmapped mnemonics and set their OpenWorks target fields. You can also change the targets for any mnemonics already mapped by the .bcl format file. Petrophysical parameters can be mapped both to Petro Parm tables and to any other OpenWorks table.

Window Layout

The Assisted Format Mapping window:



The buttons across the top allow you to:

- Save a *.bcl* mapping file (you must save before using the file for loading)
- Select all rows in the current display pane (put checks in the checkboxes); the loader looks for mnemonics in checked rows during the loading operation
- Deselect all rows in the currently display pane (clear the checkboxes); the loader ignores mnemonics in unchecked rows during the loading operation
- Clear all rows of “Table” and “Field” contents while leaving the “Mnemonic” fields alone, table data, and field data from all rows
- Search for character strings in the currently displayed pane

Buttons across the bottom allow you to navigate among the information types, to exit the AFM window, and to cancel edits before exiting.

The information area contains the information type for the displayed mnemonics, and a brief description of and instructions for the pane. Each row in the mnemonics display area contains a check box, which, if checked, indicates that the mnemonic will be mapped to the database. The mnemonic name is mapped to the selected OpenWorks table and the selected field in that table. The ellipsis buttons ... access pop-up windows to select valid values for tables and fields.

Under the rows are the total number of mnemonics for the information type and the number of mapped mnemonics.

Using Assisted Format Mapping

After scanning a file, you can use the Assisted Format Mapping utility. Generally, you should select a *.bcl* format file before using the utility.

To open the utility, select **File > Assisted Format Mapping** from the OpenWorks Curve Loader main menu bar.

When the Assisted Format Mapping window displays, the first pane is the Well Information Mapping pane. There are five panes, each displaying different data file information:

- Well Information Mapping
- Petrophysical Parameter Mapping
- Parameter Attribute Mapping
- List of Tools in Input File
- List of Equipment in Input File

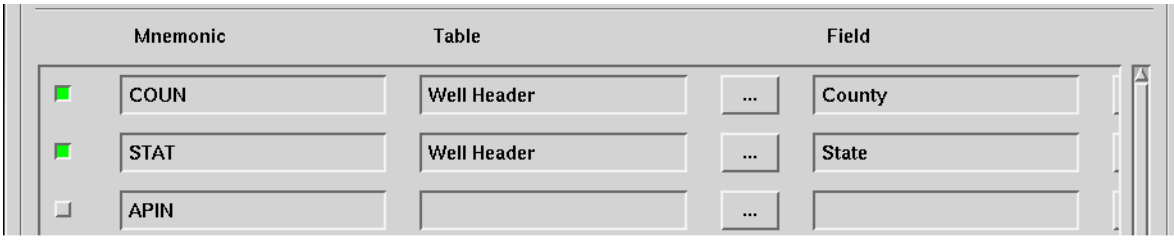
You may need to resize the window to see all the columns and buttons in a row. Use the Next and Back buttons to move between the panes.

Note

You use the **Next** and **Back** buttons to move between panes. On the last pane (List of Equipment in Input), the **Next** button is replaced by the **Finish** button. If you click the **Finish** button, the window closes without warning. Any edits you made are not lost until you scan again. You can open AFM again from the main Curve Loader window and continue editing. However, to use your edits when loading, you must save the format file within AFM, then make sure the format file is selected in the Format File field in the main Curve Loader window.

Well Information Mapping

The source of the data items (mnemonics) listed in this pane are “Well Information” objects in the scanned data file.



If the data item is already mapped to the OpenWorks database table and field by the selected *.bcl* file, the mnemonic’s checkbox is checked and the database table and field name are displayed. The total number of mnemonics found in the file and the total number of mapped mnemonics are displayed below the list. You can select and map unmapped mnemonics, and you can change the tables and fields associated with mapped mnemonics. The changes cannot be used when scanning or loading data until you save the changes to a *.bcl* file.

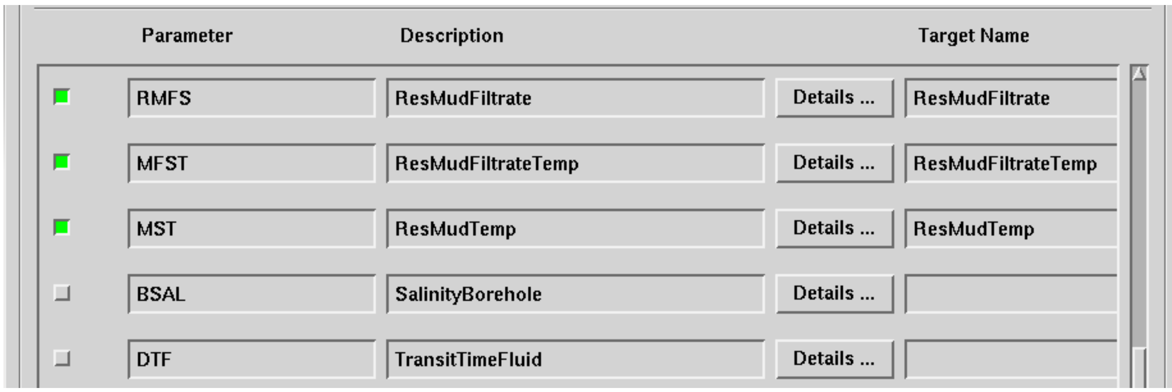
Note

All Petrophysical Parameter mnemonics that display in the Petrophysical Parameter Mapping pane also display at the end of the Well Information Mapping form to ensure maximum flexibility when creating *.bcl* files. The presence of a petrophysical parameter in both panes means you can map it two different ways—although you do not have to map it both ways. When you map a mnemonic in the Petrophysical Parameter Mapping pane, you create a petrophysical parameter (Petro Parm Value) in the database. When you map the same mnemonic in the Well Information Mapping pane, you can map the mnemonic’s value to any database table/field other than the Petrophysical Parameter table. For example, you can map KB to “Well Header/Elevation” and to a petrophysical parameter named KB in the database. It is up to you to select, map, and save *.bcl* format files that best meet your needs.

Petrophysical Parameter Mapping

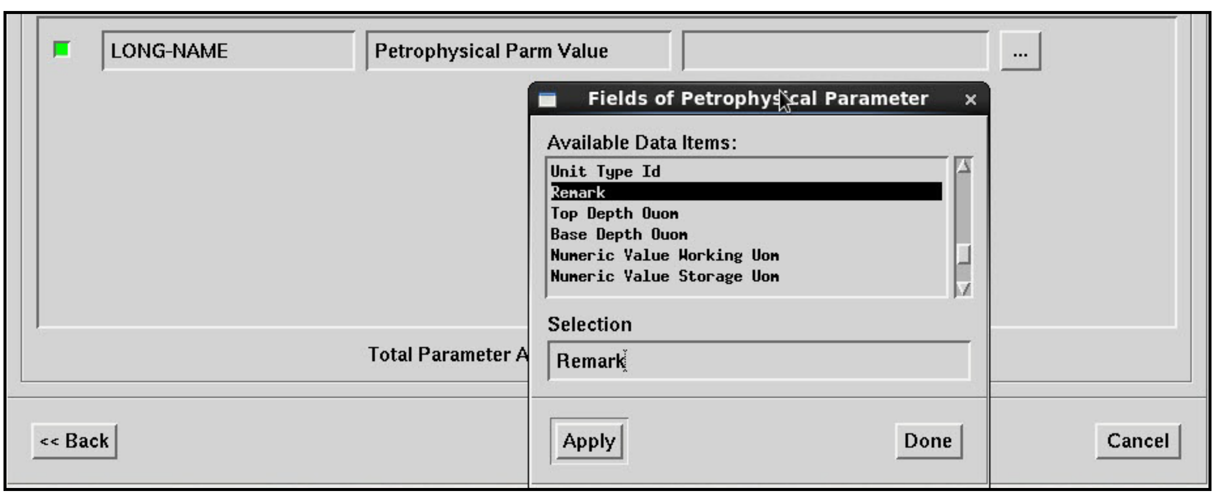
This pane displays values of petrophysical parameters scanned from the data file. Petrophysical Parameter Values can be viewed in the Well Data Manager using the Petrophysical Parm Value Data Form.

The interpretive (processing) applications supplied with PetroWorks software, as well as any applications you create using the Model Builder™ software, read parameters from the Petrophysical Parameters table that is populated with names loaded in this pane. Therefore, if you wish to use a particular parameter name in other applications, the names you enter here as Target Names must match exactly the names those applications expect.



Parameter Attribute Mapping

You can create any number of petrophysical parameters by mapping mnemonics to the Petro Parm Value table, then attaching the parameter to any of the following logging events: well, formation, depth range in a well, logging job, or logging toolstring descent, logging tool within a string, logging tool pass, or single curve. Parameters can also be recorded as being the input to or the output from log analysis activities.



The special mnemonic `$<mnemonic>` instructs Curve Loader to check, for each petrophysical parameter, if there is an associated `<mnemonic>` attribute. If so, Curve Loader loads the value of `<mnemonic>` to the appropriate field of the appropriate Petrophysical Parm table.

For example, in the tiny.bcl file, row 3 instructs Curve Loader to load the value associated with the BS mnemonic; that is, to create a parameter table with name BitSize into which the value 1.50 will be loaded. However, row 3 does not instruct Curve Loader to load the description, the unit, or the dimension of the parameter object. $LONGNAME instructs Curve Loader to check, for each petrophysical parameter, if there is an associated LONG-NAME attribute. If so, Curve Loader loads the value of LONG-NAME to the Remark field of the appropriate Petrophysical Parm table.

Currently, there are no appropriate places in the OpenWorks database to store values associated with such mnemonics as UNIT or DIMENSION, so although $UNIT and $DIMENSION keywords are valid row entries for a *.bcl* file, the values that these keywords check for are not currently mapped.

List of Tools in Input

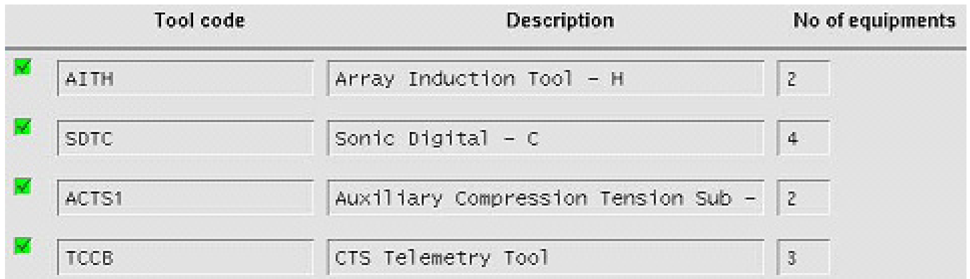
This pane displays the tool codes, tool descriptions, and the number of pieces of equipment per tool as scanned from the data file. The individual pieces of equipment per tool are detailed on the List of Equipment in Input pane.

Either all tools are selected or no tools are selected, as specified by the currently selected .bcl file. If the .bcl file contains the #DOALL keyword mnemonic for the Logging Tool Config Data Category, then all tool rows are selected in the pane. The check marks are grayed out because you cannot select individual tools.

If the *.bcl* file does not include the #DOALL keyword mnemonic for the Logging Tool Config Data Category, the boxes are not checked.

You can unselect all tools by clicking on the **Unselect All** button near the top of the pane. When you do this and then save the modified format mappings to a *.bcl* file, the #DOALL keyword is not saved.

If no tools are selected, you can click the **Select All** button near the top of the pane. This selects all tools in the pane and causes the #DOALL keyword mnemonic to be added when you save the modified format mapping to a *.bcl* file.

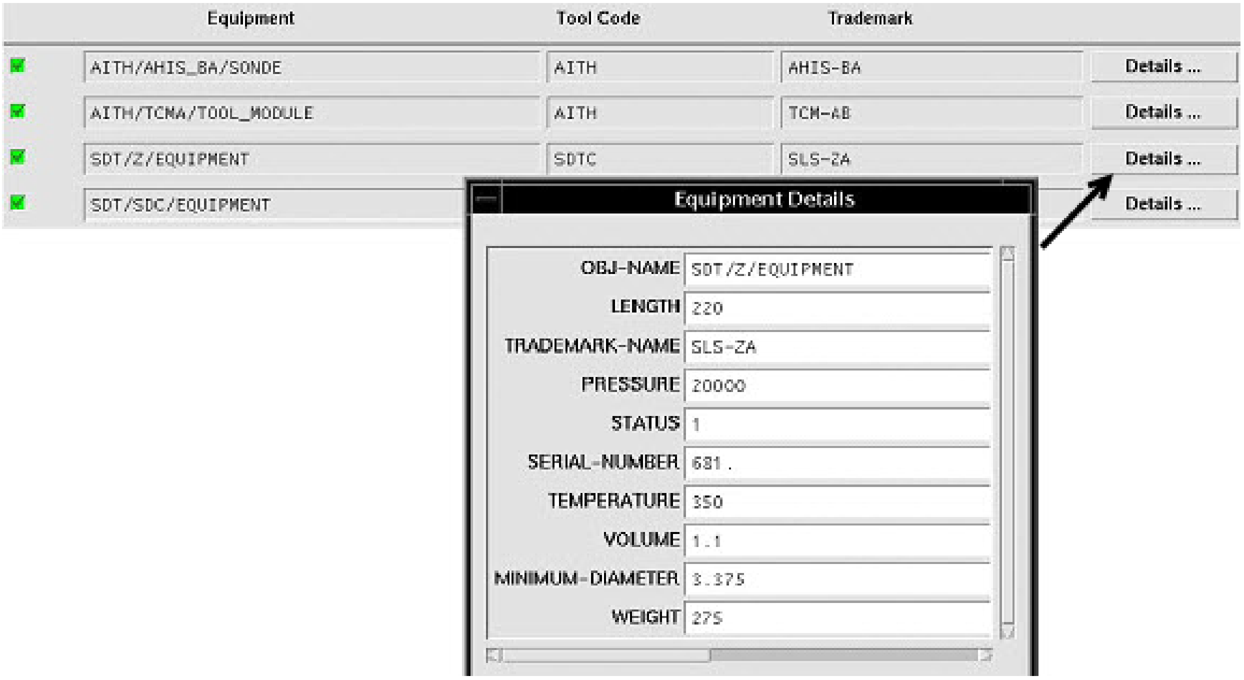


List of Equipment in Input

This pane lists the individual pieces of equipment associated with each tool in the List of Tools pane. If the Tool group is selected for loading, as specified by the #DOALL keyword mnemonic for the Logging Tool Config Data Category in the currently selected *.bcl* file, then the equipment is also selected for loading. The check marks are grayed out because you cannot select individual tools.

You can deselect equipment here, save the modified *.bcl* file, and still load all tool mnemonics, but if you unselect the tool mnemonics in the previous pane and save the modified *.bcl* file—even if the equipment appears to be selected—the #DOALL keyword will not be saved to the *.bcl* file. Neither the tools nor the equipment information will be loaded.

You can click the ellipsis button to the right of the Trademark column to see details for the piece of equipment in the row.



Exercise 7-3. Assisted Format Mapping (LAS Format)

Before you load the LAS file, complete the following steps to look at it in WOW™ software:

1. Enter `http://<your machine name here>/` in the address line of your browser.

2. Click **Other Data** in the left pane of the WOW software main window.

3. Click **data** and then load in the middle pane of the WOW software main Window, to access the directory where the LAS file is.

4. Click **APATITEwPPP.las** in the middle pane of the WOW software main window.

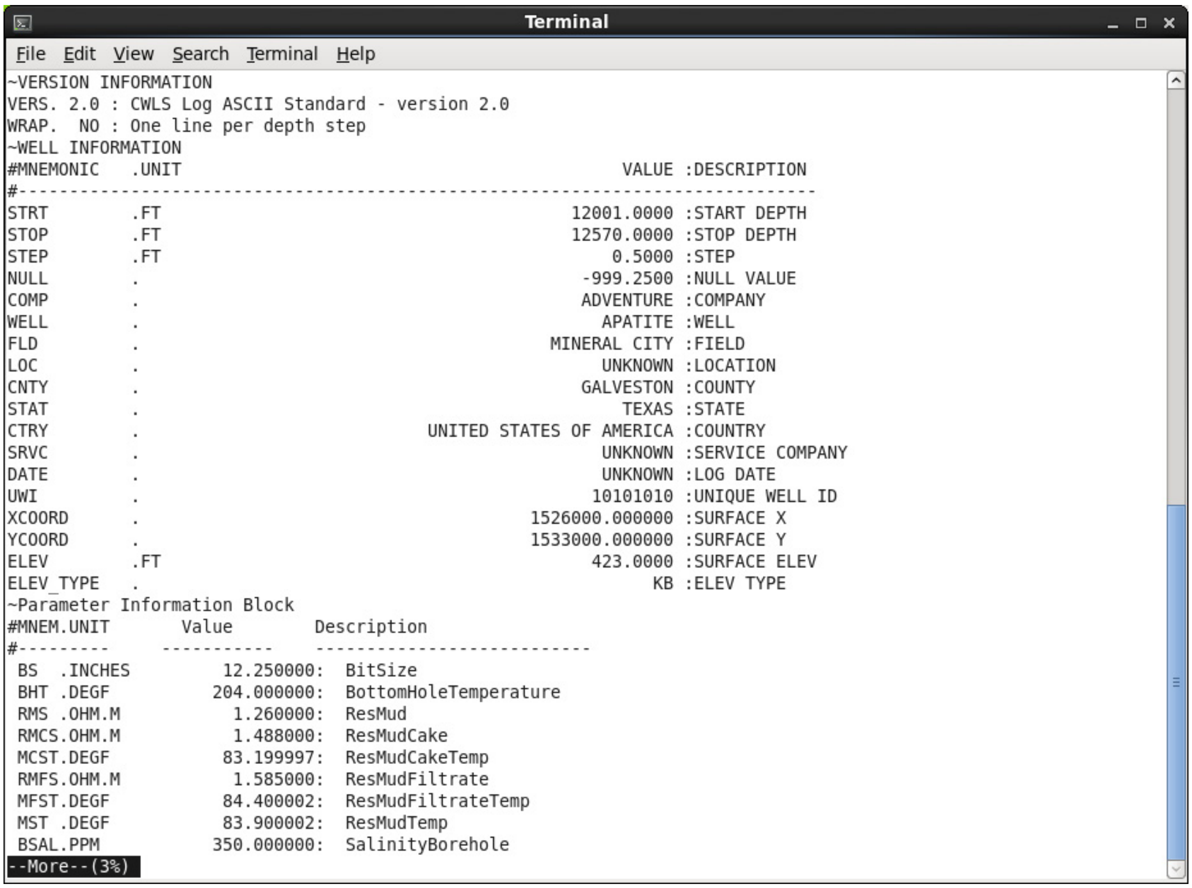
5. Click **Display raw LAS data**. Note the Parameter Information Block section of the contents file. This contains all the petrophysical parameters you will map in this exercise.

6. In the Display Curve section in the middle pane, change **skip to linear** for all four logs and click **Go** to preview the logs.

In this exercise you use Assisted Format Mapping to map well information and petrophysical parameters.

1. Before you load the LAS file, look at it in an xterm window.

   - Open an xterm window.
   - Navigate to the location of the file **APATITEwPPP.las**. The file location is supplied by your instructor.
   - Type **`more APATITEwPPP.las`**.



```
Terminal
File  Edit  View  Search  Terminal  Help
~VERSION INFORMATION
VERS. 2.0 : CWLS Log ASCII Standard - version 2.0
WRAP.  NO : One line per depth step
~WELL INFORMATION
#MNEMONIC    .UNIT                                         VALUE :DESCRIPTION
#-------------------------------------------------------------------------------
STRT         .FT                                      12001.0000 :START DEPTH
STOP         .FT                                      12570.0000 :STOP DEPTH
STEP         .FT                                          0.5000 :STEP
NULL         .                                         -999.2500 :NULL VALUE
COMP         .                                         ADVENTURE :COMPANY
WELL         .                                           APATITE :WELL
FLD          .                                      MINERAL CITY :FIELD
LOC          .                                           UNKNOWN :LOCATION
CNTY         .                                         GALVESTON :COUNTY
STAT         .                                             TEXAS :STATE
CTRY         .                          UNITED STATES OF AMERICA :COUNTRY
SRVC         .                                           UNKNOWN :SERVICE COMPANY
DATE         .                                           UNKNOWN :LOG DATE
UWI          .                                          10101010 :UNIQUE WELL ID
XCOORD       .                                    1526000.000000 :SURFACE X
YCOORD       .                                    1533000.000000 :SURFACE Y
ELEV         .FT                                        423.0000 :SURFACE ELEV
ELEV_TYPE    .                                                KB :ELEV TYPE
~Parameter Information Block
#MNEM.UNIT       Value        Description
#---------     -----------    --------------------------
 BS  .INCHES        12.250000:  BitSize
 BHT .DEGF         204.000000:  BottomHoleTemperature
 RMS .OHM.M          1.260000:  ResMud
 RMCS.OHM.M          1.488000:  ResMudCake
 MCST.DEGF          83.199997:  ResMudCakeTemp
 RMFS.OHM.M          1.585000:  ResMudFiltrate
 MFST.DEGF          84.400002:  ResMudFiltrateTemp
 MST .DEGF          83.900002:  ResMudTemp
 BSAL.PPM          350.000000:  SalinityBorehole
--More--(3%)
```

   - Note the **Parameter Information Block** section of the file. This section contains all of the petrophysical parameters you will map in this exercise.

   - Type `q` to quit the `more` command you typed earlier.

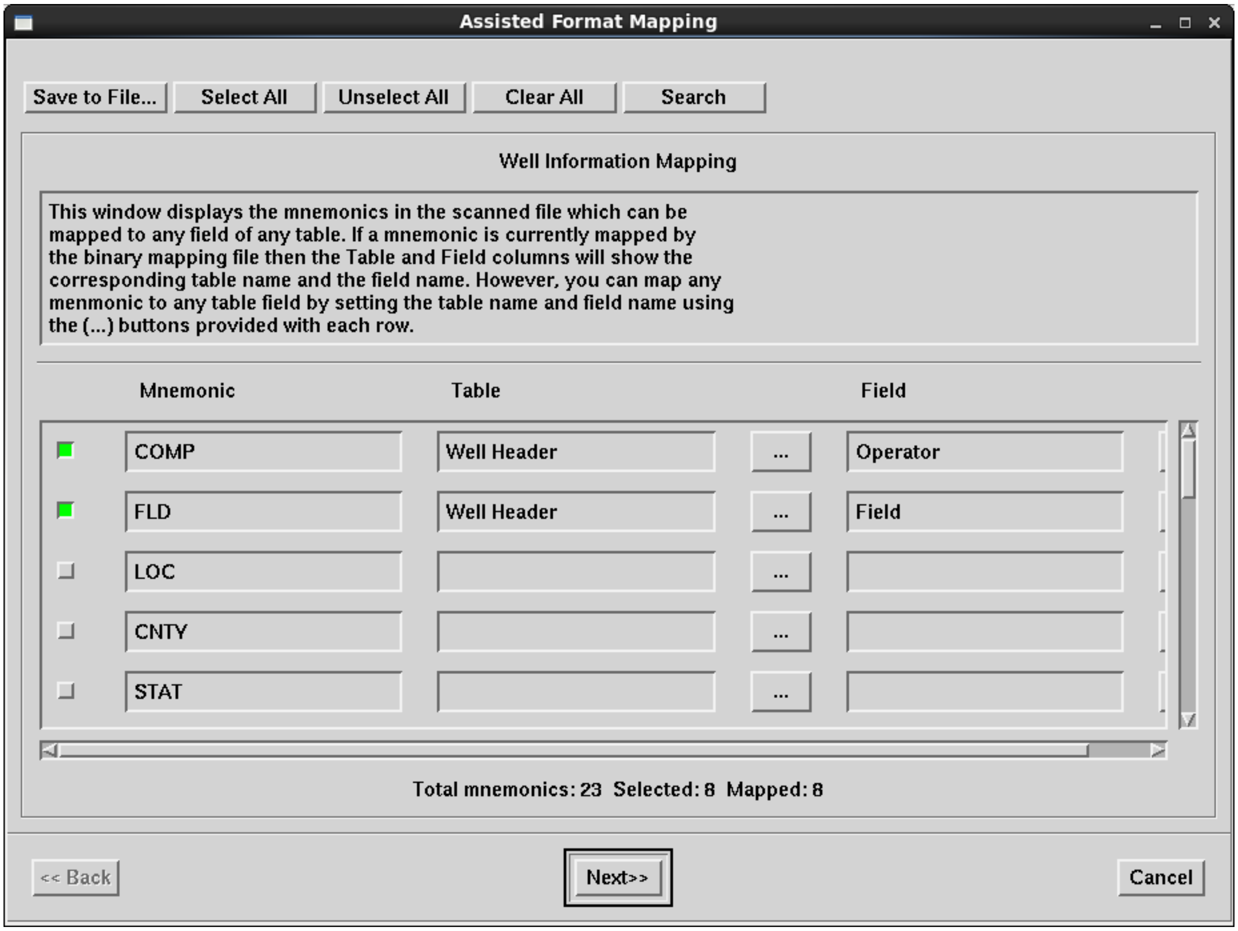
2. In the Curve Loader, select **LAS** as your Format Type.

3. Select **`APATITEwPPP.las`** as your Input Data File.

4. Select the Format File **`Halliburton.bcl`**.

5. Scan your data file.

6. Select **File > Assisted Format Mapping** to open Assisted Format Mapping. The dialog box opens to Well Information Mapping.

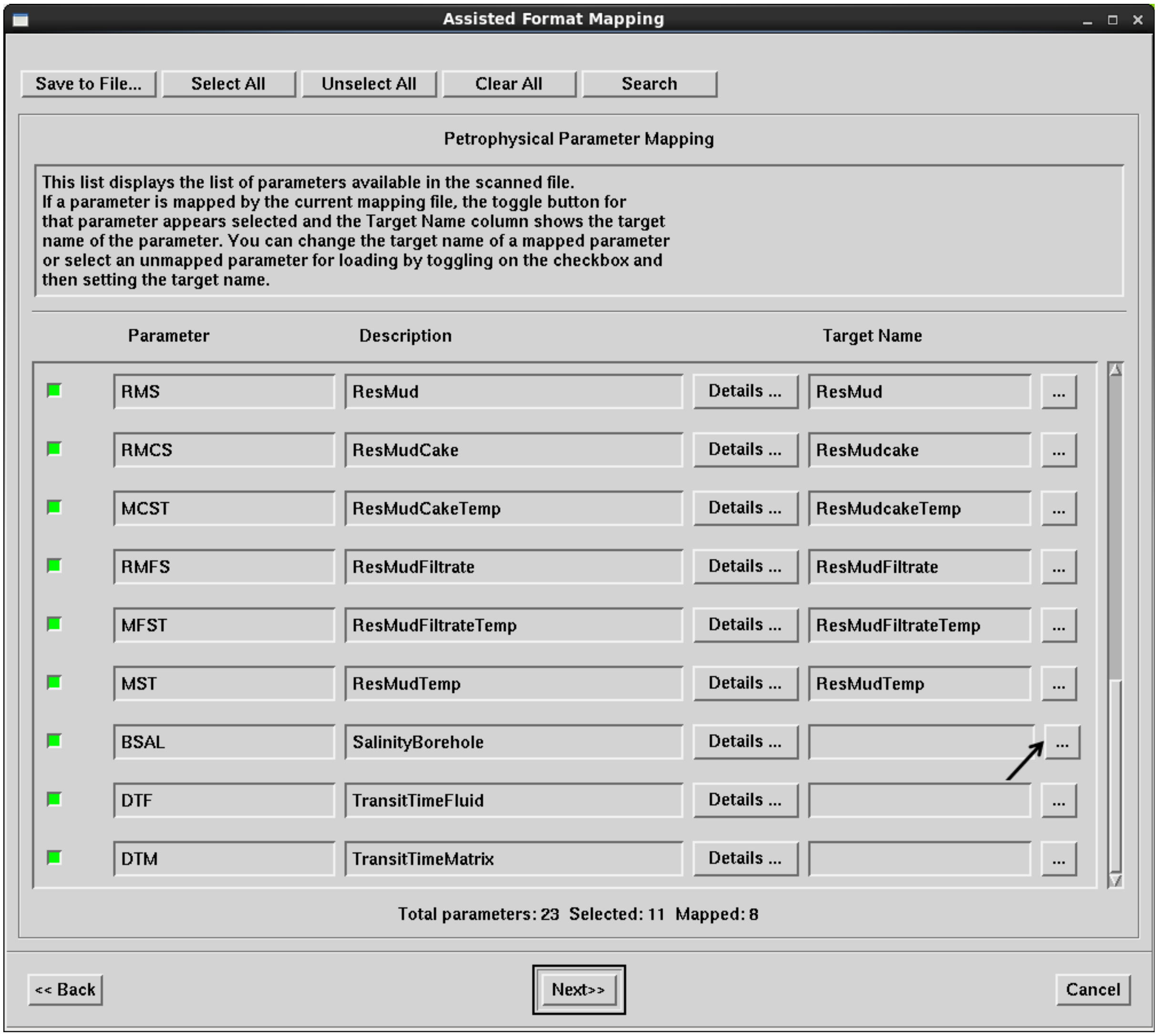


Notice the tables and fields that the COMP, FLD, DATE, BS, RMS RMFS, MFST, and MST mnemonics are mapped to.

7. Click **Next** to view the Petrophysical Parameter Mapping. The following parameters are mapped here: BS, BHT, RMS, RMCS, MCST, RMFS, MFST, and MST. You must add the BSAL, DTF, and DTM parameters from the file. Refer to your **xterm** window again to view these mnemonics.

   - Toggle ON the **BSAL**, **DTF**, and **DTM** mnemonics.
   - Select the ellipsis (**...**) button in the Target Name column on the BSAL row (near the bottom of the table).

- Highlight **SalinityBorehole** in the Petro Parm List and click **Apply**.

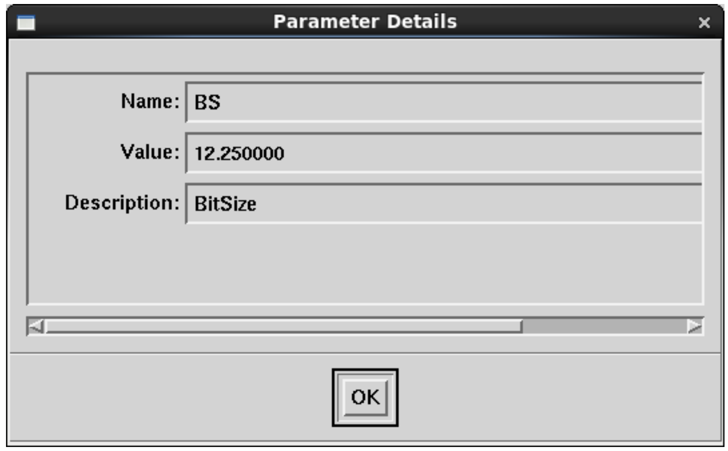


- Select the ellipsis (**...**) button in the **DTF** row. Highlight TransitTimeFluid and click **Apply**.

- Select the ellipsis(**...**) button in the **DTM** row. Highlight TransitTimeMatrix and click **Apply**. Then click **Done** to close the Petro Parms List.

8. Select the **Details** button next in the **BS-BitSize** row (middle of the table). The Parameter Details dialog box displays. You are supplied

with the parameter name, the value of the parameter, and a description of the parameter.



You can click the **Details** button of any mapped petrophysical parameter to retrieve this information. Click **OK** to dismiss the Parameter Details dialog box.

9. At the bottom of the Assisted Format Mapping window, click **Next** to view the Parameter Attribute Mapping. No mnemonics are mapped in Parameter Attribute Mapping.

10. Click **Next** to view the List of Tools in Input mnemonics and **Next** to view List of Equipment in Input mnemonics. Notice that no parameters are mapped.

11. Select **Save to File** from the Assisted Format Mapping dialog box. In the Options dialog box select **Save only mapped rows**. Click **OK**.

12. When the File Selection dialog box displays, name the file `APATITE.bcl` and click **OK**.

13. Click **Next** to view the List Equipment in Input and then click **Finish** in the Assisted Format Mapping dialog box to close the window.

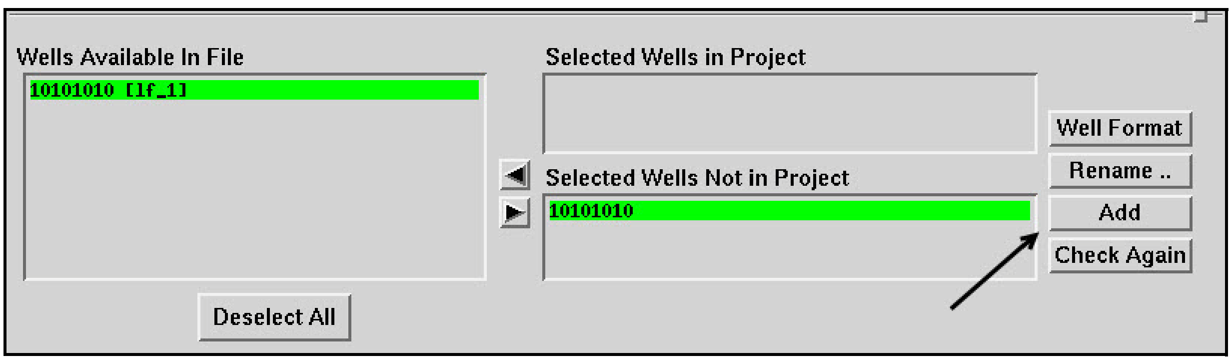
> **Note**
>
> When you click the Finish button in Assisted Format Mapping, you will not be prompted to save your file. Take care to save your file first.

14. In the OpenWorks Curve Loader, select **APATITE.bcl** as your Format File. (If APATITE.bcl does not display in the list of Format Files, select **Filter** to refresh the list).

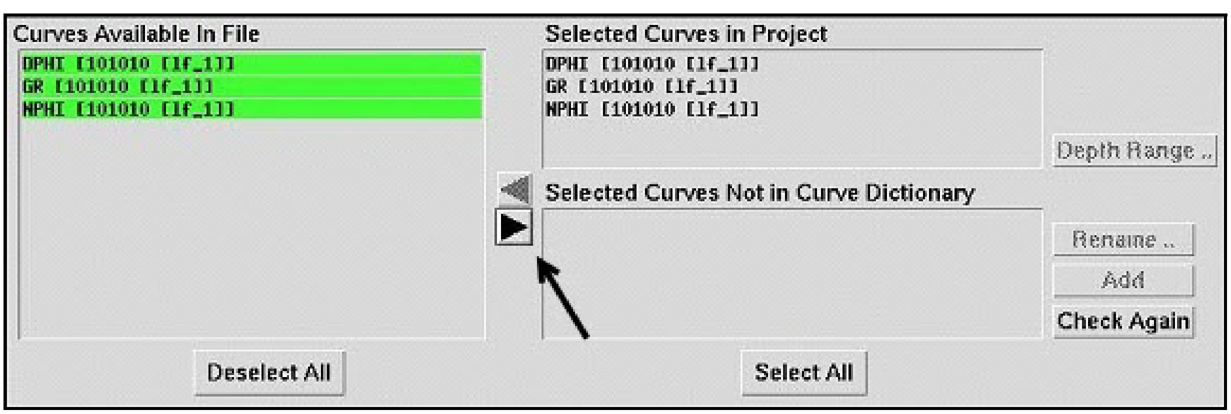
15. Scan the file again. Notice that the well is not in the project.

16. Load the file.

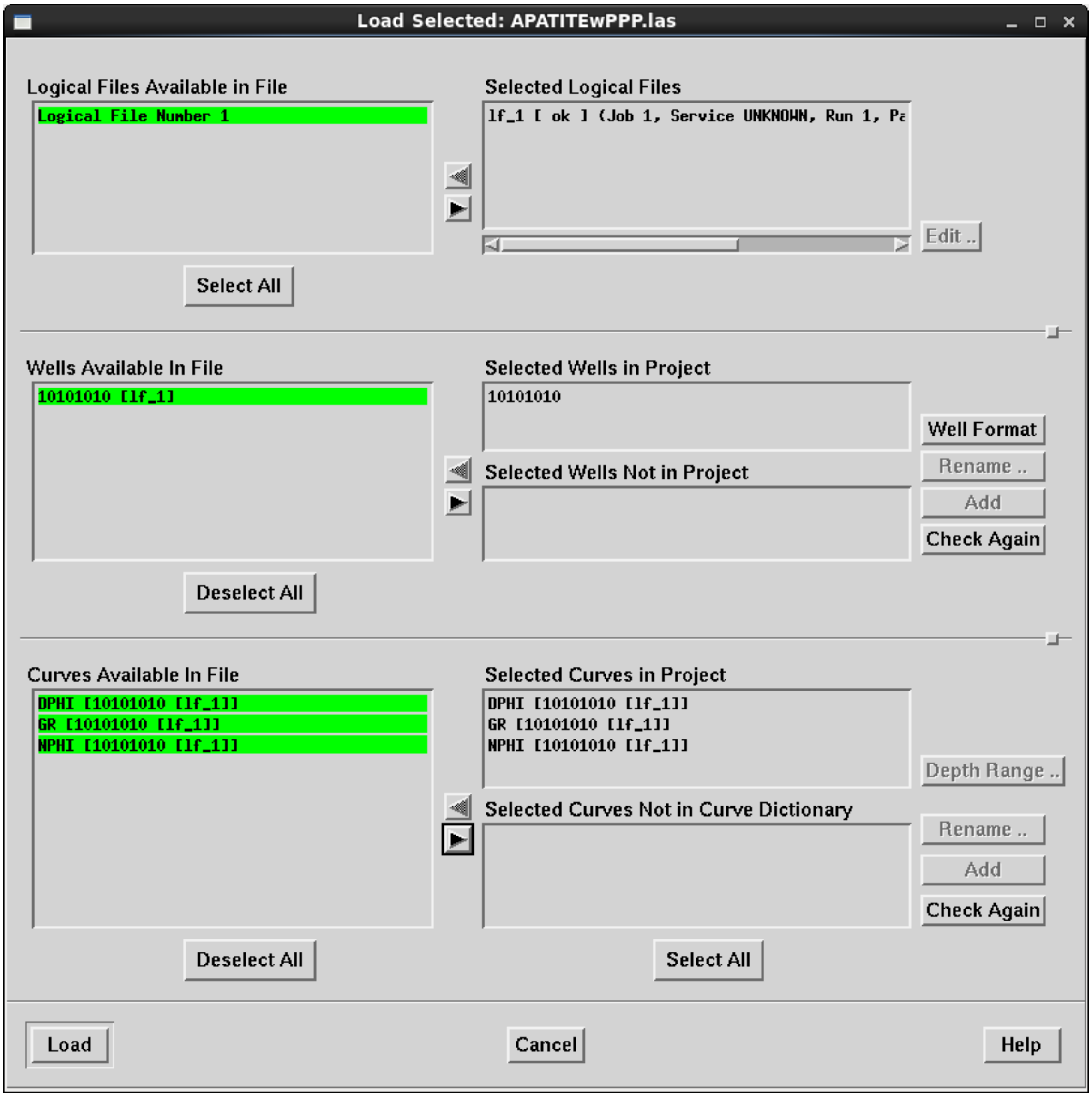
- Select **File** > **Load Select** from the OpenWorks Curve Loader.
- Select **Logical File Number 1** and move it to Selected Logical Files.
- Select well **10101010 [lf_1]** and move it to the right side of the dialog box. Notice that the well is not in the OpenWorks project.
- If you want to see more details about the new well, click **Well Format** and choose the appropriate format to display.
- Select the well and click **Add**. The well is now recognized within the OpenWorks project.



- **Select All** of the available curves and move them to the right side of the dialog box.



Your dialog box should look similar to the one shown here.

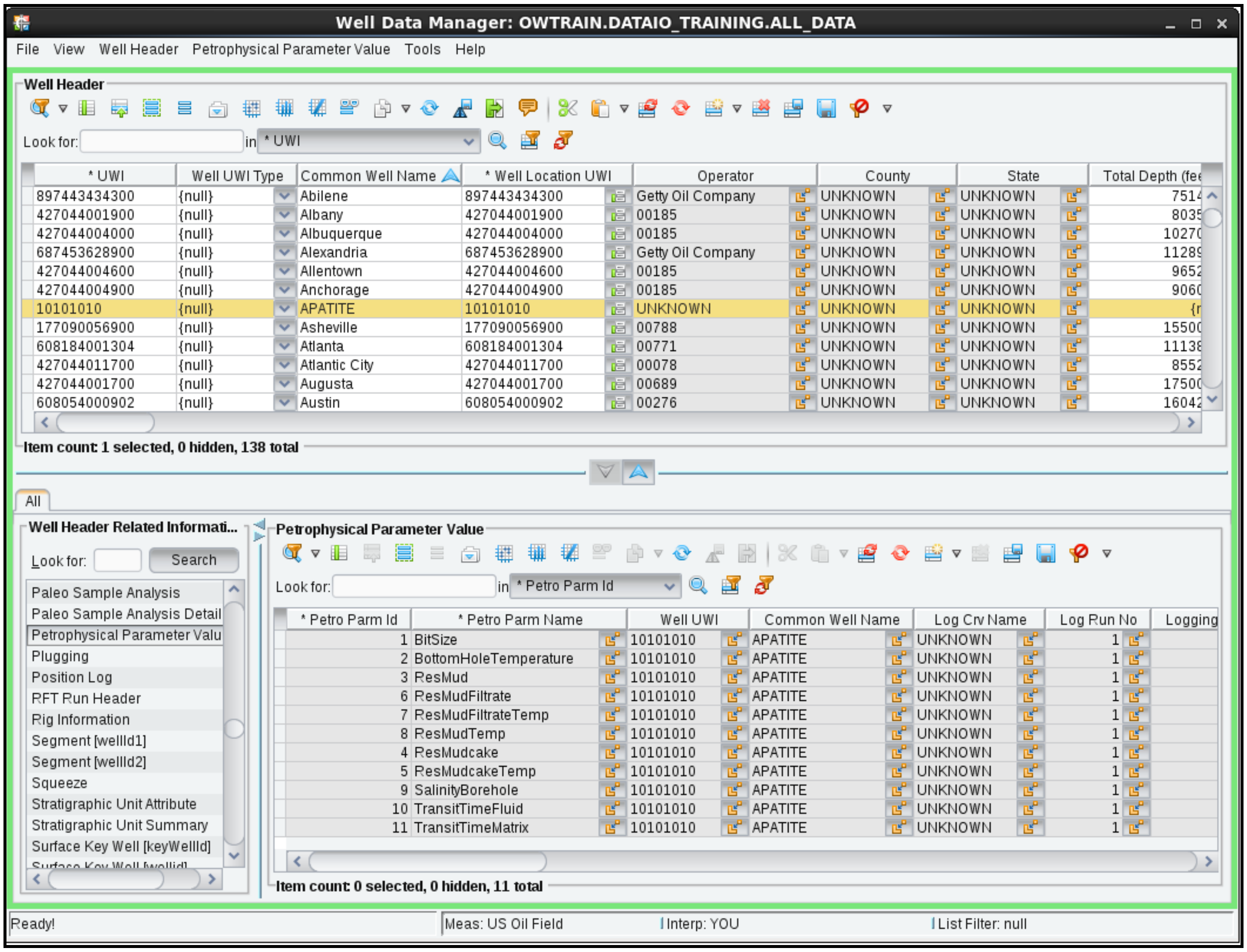


17. Select **Load** to load the selected data. If a confirmation dialog box displays, select **Update None** and **Do not show this dialog box again**. Click **Continue**. Click **Close** to dismiss the Load Selected dialog box.

18. Next, you verify that your petrophysical parameters were loaded properly.

    - From the OpenWorks Command Menu, select **Data > Management > Well Data Manager**. Select All Well Header.

- Select the **APATITE** well and the **Petrophysical Parameter Value** data form.



The petrophysical parameters you identified using Assisted Format Mapping are displayed in the Well Data Manager.

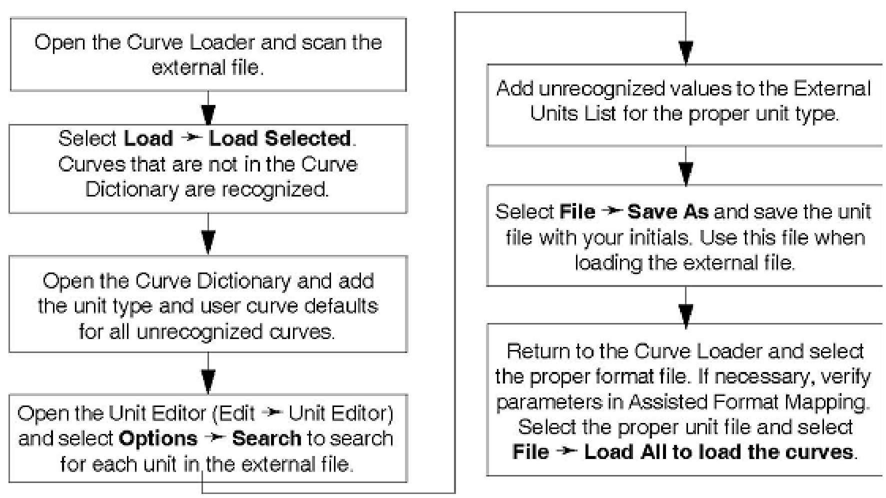
Although they will not be used here, petrophysical parameters are integral in petrophysical analysis. Petrophysical interpretive applications and user-defined models from PetroWorks software Model Builder require parameters that control computational results and program flow.

For example, calculations of mineral properties, fluid properties, and processing flows are based on the availability and quality of input. Wellbore Parameter Editor (WPE) is a PetroWorks software utility that lets you view and edit wellbore parameter data for use in PetroWorks software applications and petrophysical models.

Units of Measure (UOM)

As discussed in Chapter 5, the Curve Loader handles units of measurement differently than any other data in the OpenWorks software. This section presents workflows for determining the proper units of measure and for correcting units of measure if they are loaded incorrectly.

First, you must determine which curves are not automatically recognized by the Curve Dictionary. To do this, scan the data file in the Curve Loader and open the Load Selected dialog box to view curves not in the Curve Dictionary. Next, open the Curve Dictionary and add the new curve name, units, and unit type. This allows storage units of measure to be converted to project and session units of measure. Finally, verify that the units from the data file are in the *unit.UNIT* file using the Unit Editor.



Often, you may have to work with curves that were loaded with the incorrect units of measure. This section offers a solution for fixing curve units.

To determine if units were loaded correctly, first open Well Data Manager and/or Well Curve Viewer to view the curve units/curves. In the Well Data Manager you can view the Log Curve Data Form to determine if the units were loaded correctly. In the Well Curve Viewer you can view session and storage units to determine if the curves have the proper units.

Exercise 7-4. Units of Measure

In this exercise you load the PLATINUM_NEUP.LAS well. You are required to verify and correct any units of measure problems in the exercise.

1. View your **PLATINUM_NEUP.LAS** file in an xterm window. Examine the units in the Curve Information Block.

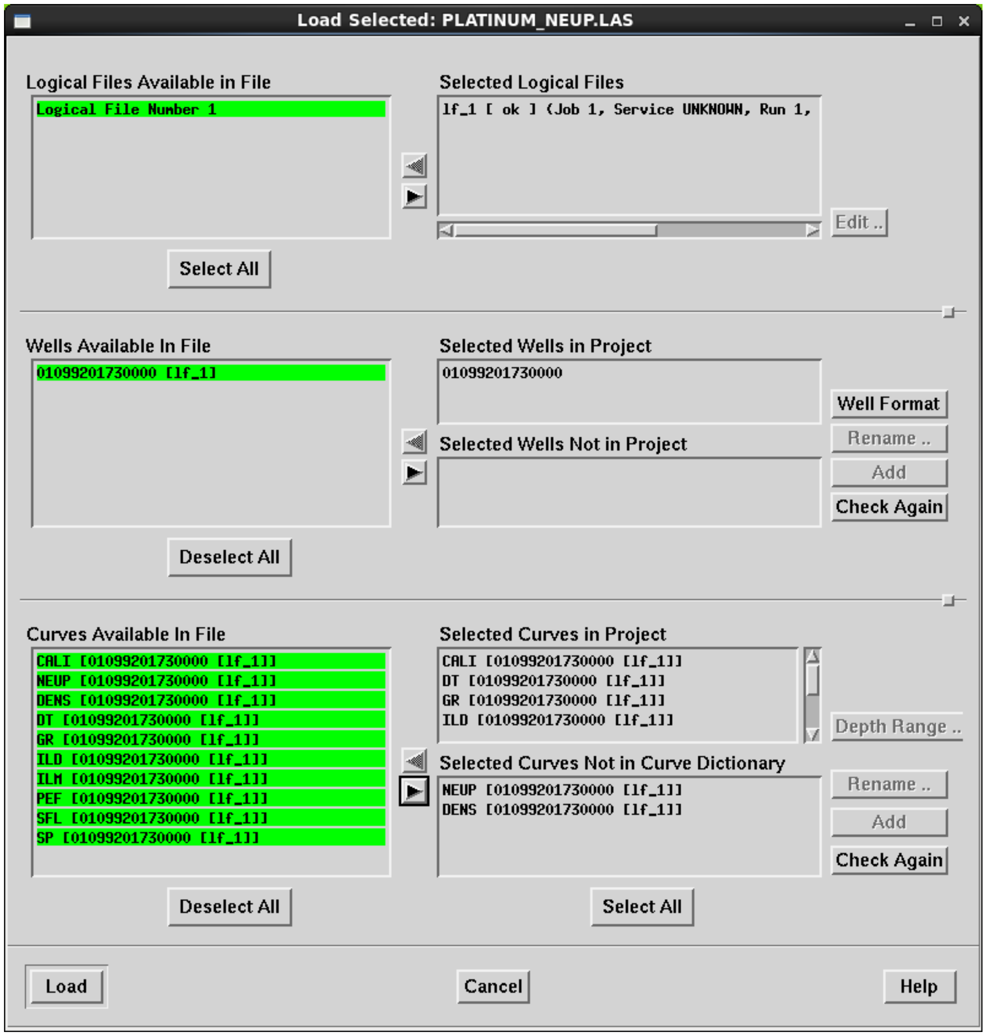
2. Open the Curve Loader and scan the **PLATINUM_NEUP.LAS** well. Do not use a Format or File at this time. To remove a Format File from the Curve Loader, highlight the Format File and press <**Delete**>.

3. Select **File > Scan**. **File > Load Select**.

4. Select **Logical File Number 1** and well **01099201730000 [lf_1]**.

5. Add the well to the project.

6. When the Load Selected dialog box displays, click **Select All** in the Curves Available in File section. Notice that the NEUP and DENS curves are not recognized by the Curve Dictionary.



7. Now you edit the Curve Dictionary to recognize these curves. Open the Curve Dictionary (**Data > Management > Curve Dictionary**).

8. When **Curve Dictionary** window opens, click the **Add new project curve detail**  button and set these values for the new curve mnemonic DENS:

Entry	Value
Curve Name	DENS
Unit Type Name	Density Solid
Scale Type	Linear

Entry	Value
Track	Right
Left Scale Storage	2
Right Scale Storage	3
Scale Storage UOM	g/cm^3

9. Click the **Save** icon to add the DENS curve to the dictionary.

10. Enter the following information for the NEUP curve.

Entry	Value
Curve Name	NEUP
Unit Type Name	Porosity
Scale Type	Linear
Track	Right
Left Scale Storage	0.5
Right Scale Storage	0
Scale Storage UOM	v/v decimal

11. Return to the **Load Selected** dialog box and select **Check Again** in the Curves Available in File section of the dialog box. Your curves are now recognized by the Curve Dictionary.

12. Select **Edit > Unit Editor** to open the Unit File Editor. If it is not already open, open the `unit.UNIT` file.

13. Select **Options > Search** to search for each unit in the LAS file. Search for each of the following External Unit (Unit Type):

    - F (depth measure)
    - IN (hole diameter)
    - PRCT (porosity)
    - G/CM3 (density solid)
    - US/FT (interval transit time)
    - GAPI (gamma count rate)
    - OHM.M (electrical resistivity)

- b/elec (photoelectric absorption)
- MV (electric potential)

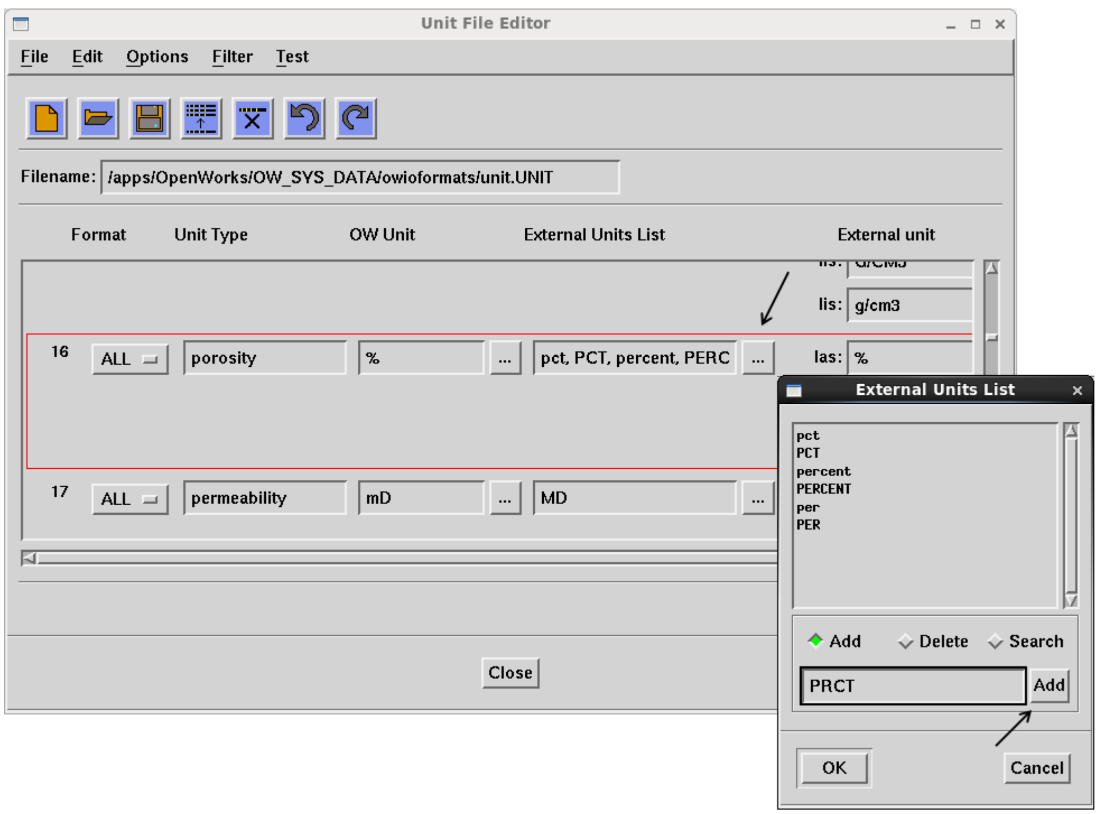
If you cannot find the unit, it must be added to the proper External Units List. To add a unit:

- Navigate to the proper Unit Type. To determine the proper unit type, search for similar units (e.g., for PRCT try searching for %, for b/elec try searching for B/E)

- Select the (**...**) button under External Units List.

> **Note**
>
> Make sure the proper unit value is found. The search feature will point to MIN when searching for IN, so you must check the value carefully.

- Type the name of the unit and click **Add**. The unit is added to the External Units List. Click **OK** to close the window.



- Repeat this process until all units are added to the unit file.

14. Select **File** > **Save As** to save the unit file. Save the file as **unit_YOU.UNIT**. Click **OK**.

15. Return to the Curve Loader. Select the Format File `LGC.bcl`.

16. Select the Units File **unit_YOU.UNIT**.

17. Scan the file.

18. Select **File > Assisted Format Mapping**.

19. In the Well Information Mapping section, map the following:

Defined Mnemonic	Table	Field
XCOORD	Well Header	X Coordinate
YCOORD	Well Header	Y Coordinate
CRS_ID	Well Header	Orig Crs ID
CWN	Well Header	Common Well Name

20. Click **Next** to view PetroPhysical Parameter Mapping. Map the following:

Defined Mnemonic	Description	Target Name
DENMAT	Matrix Density	DensityMatrix
XMUDWT	Mud Weight	WeightMud
RM	Mud Resistivity	ResMud
RMF	Mud Filtrate Resistivity	ResMudFiltrate
TRM	Ref Temp for Mud Resistivity	ResMudTemp
TRMF	Ref Temp for Mud Filtrate Resistivity	ResMudFiltrateTemp

21. Select **Save to File**.

22. Select **Save All Rows** and click **OK**. Name the file **LGC_PLATINUM_YOU.bcl**.

23. Click **Cancel** to close the dialog box.

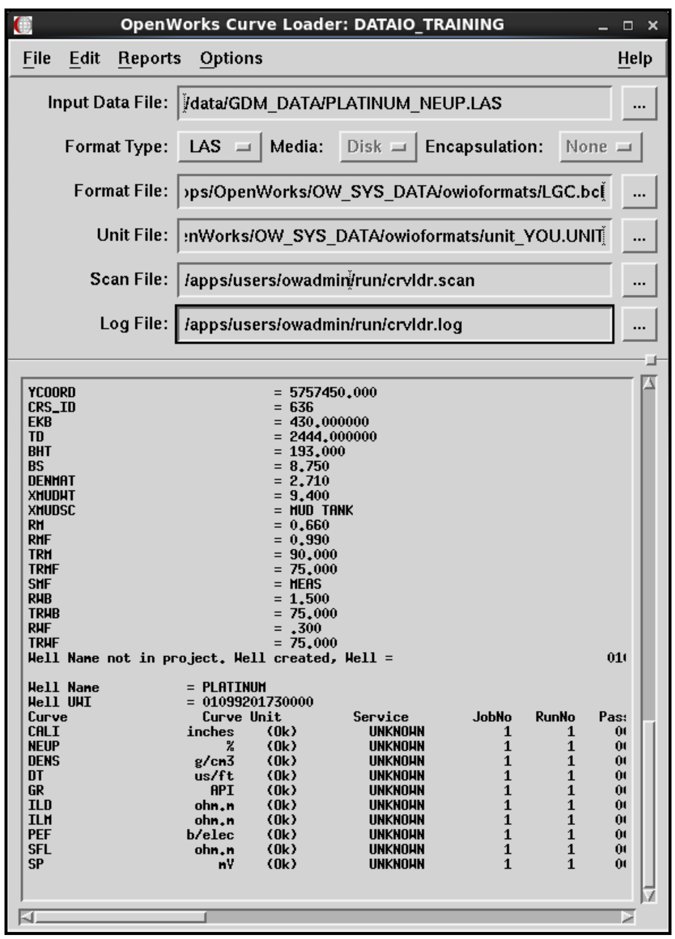
> **Note**
>
> If you click Next through the other parameter screens, you eventually see a button labeled Finish. Make sure to save your file before clicking Finish or all changes will be lost.

24. Return to the Curve Loader and select the new Format File, **LGC_PLATINUM_YOU.bcl**. You may have to click **Filter** in the File Selection dialog box to see the file.

25. Select **File > Load All**. Select Handle Invalid Well Names by **Creating Well Instances** and Handle Invalid Curve Names by **Dropping Invalid Curves**. Click **OK**.

26. If the Confirmation dialog box displays, select **Update None** and click **Continue**.

27. View the information in the Curve Loader window.

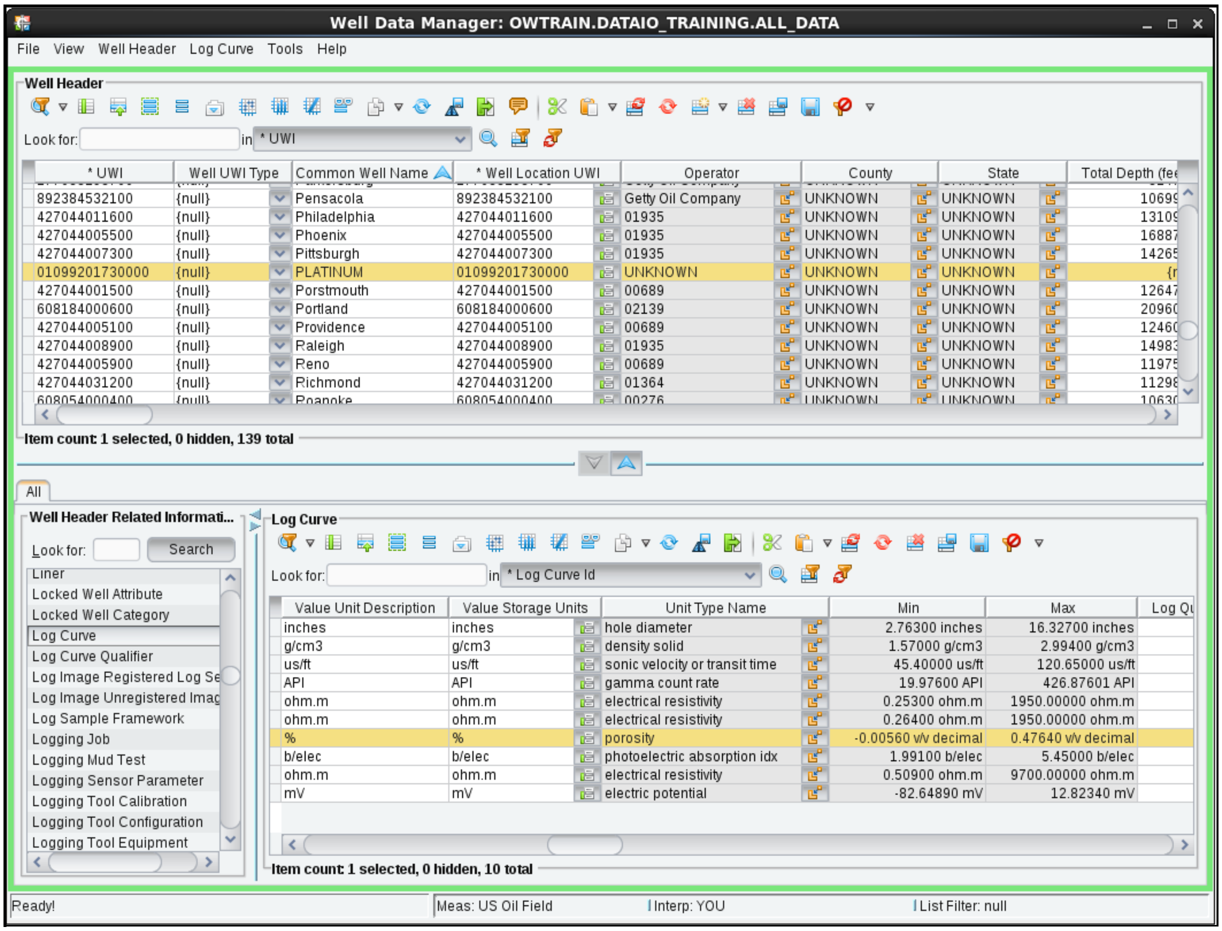


28. Open the Well Curve Viewer. Select **File** > **Read All**.

29. Select the **PLATINUM** well and the **NEUP** curve. Toggle between **Units of Session** and **Storage**.

30. Open the Well Data Manager. Select the **PLATINUM** well and the **Log Curve Data Form**.

31. Examine the **NEUP** log curve values for curve units and Min and Max values.



32. Exit Well Data Manager and Well Curve Viewer.

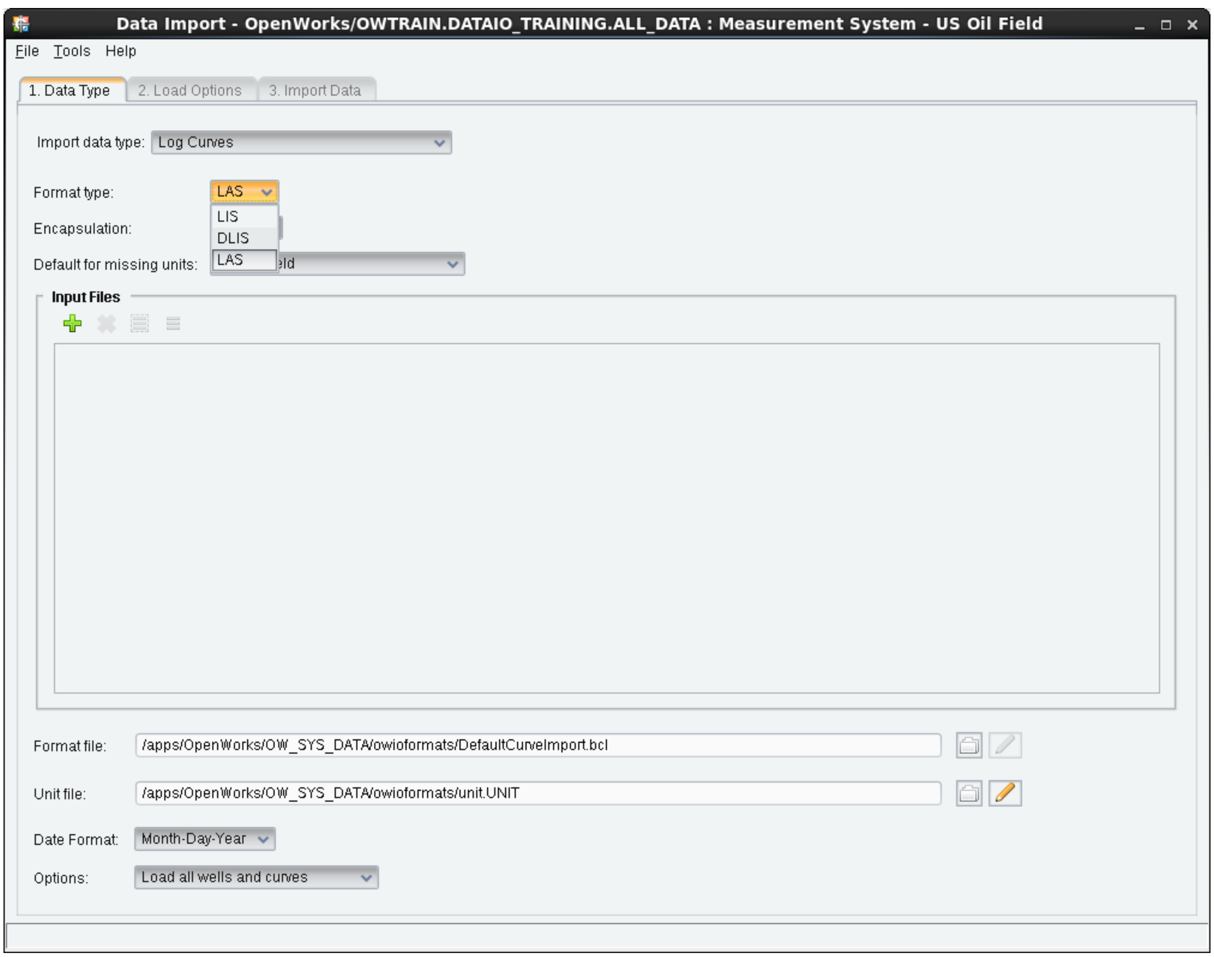
Loading Multiple Binary Curves

The Data Import tool has the capability of importing multiple binary curve files in one load job. The loader supports three curve formats: LIS, DLIS, LAS.

Setting the Input Specifications

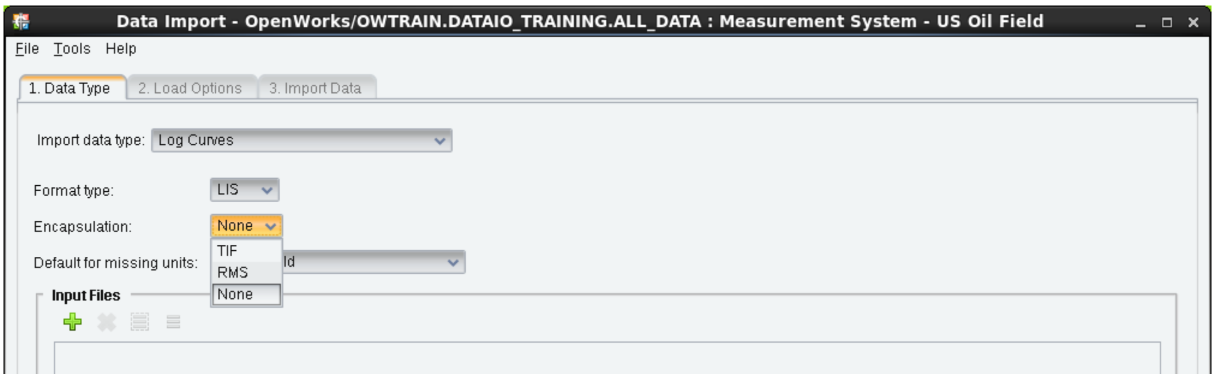
The Data Import tool supports three binary curve formats: LIS, DLIS, LAS. Before you can scan and load binary curve data, you must set input specifications in the Data Type tab window, including the following:

- Import data type
- Format type of the data file
- Encapsulation format
- Default for missing unit

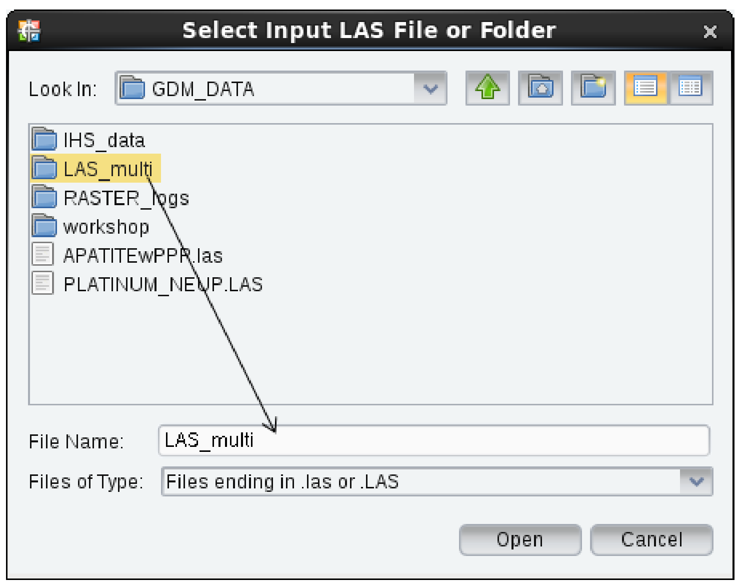


For LIS log curves only, you can choose from three Encapsulation formats:

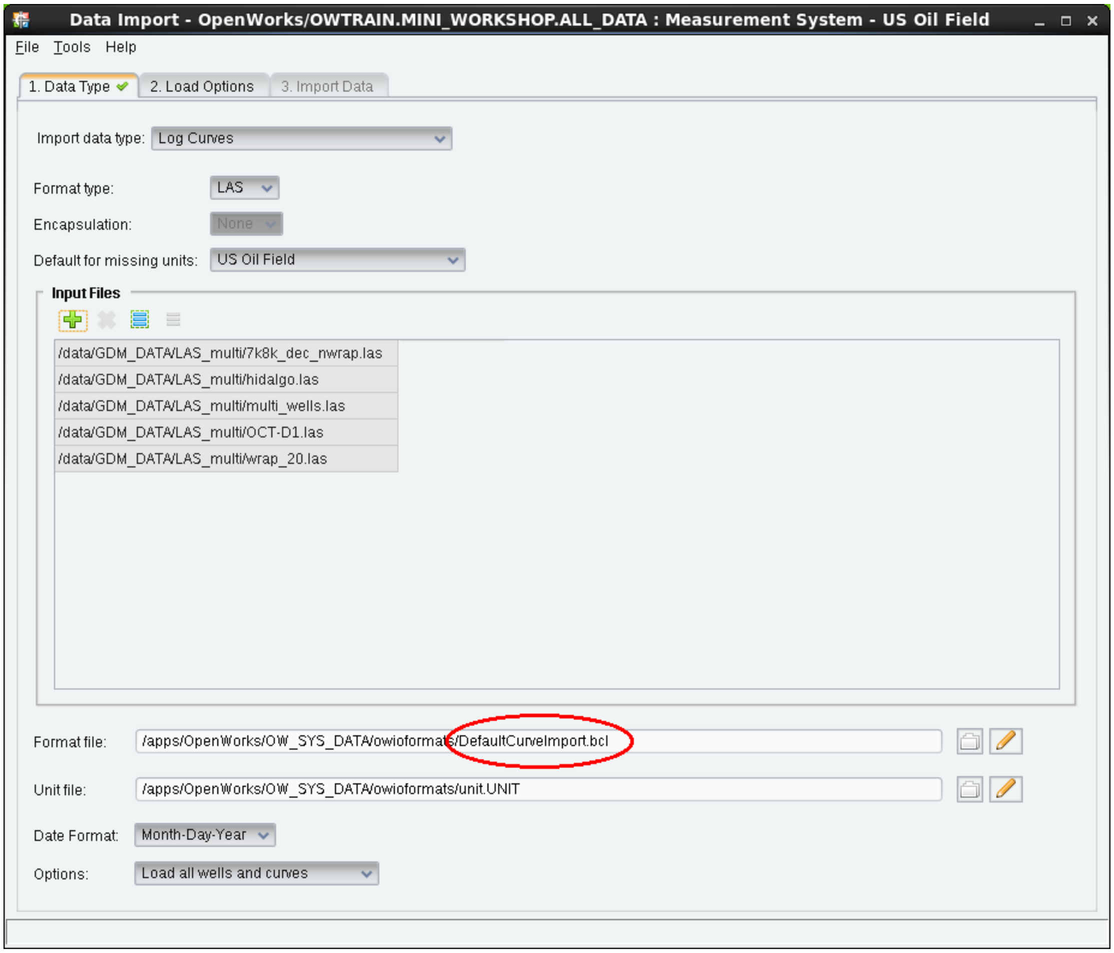
- **TIF** – Schlumberger's Tape Image Format
- **RMS** – Record Management System format
- **None** – no header records display at the top of the input data file



The Data Import tool allows you to select one or more curve files of the same type for one load job. You can select individual log files, or a folder of log files.



The selected curve files are listed in the Input Files field in the Data Type tab window.

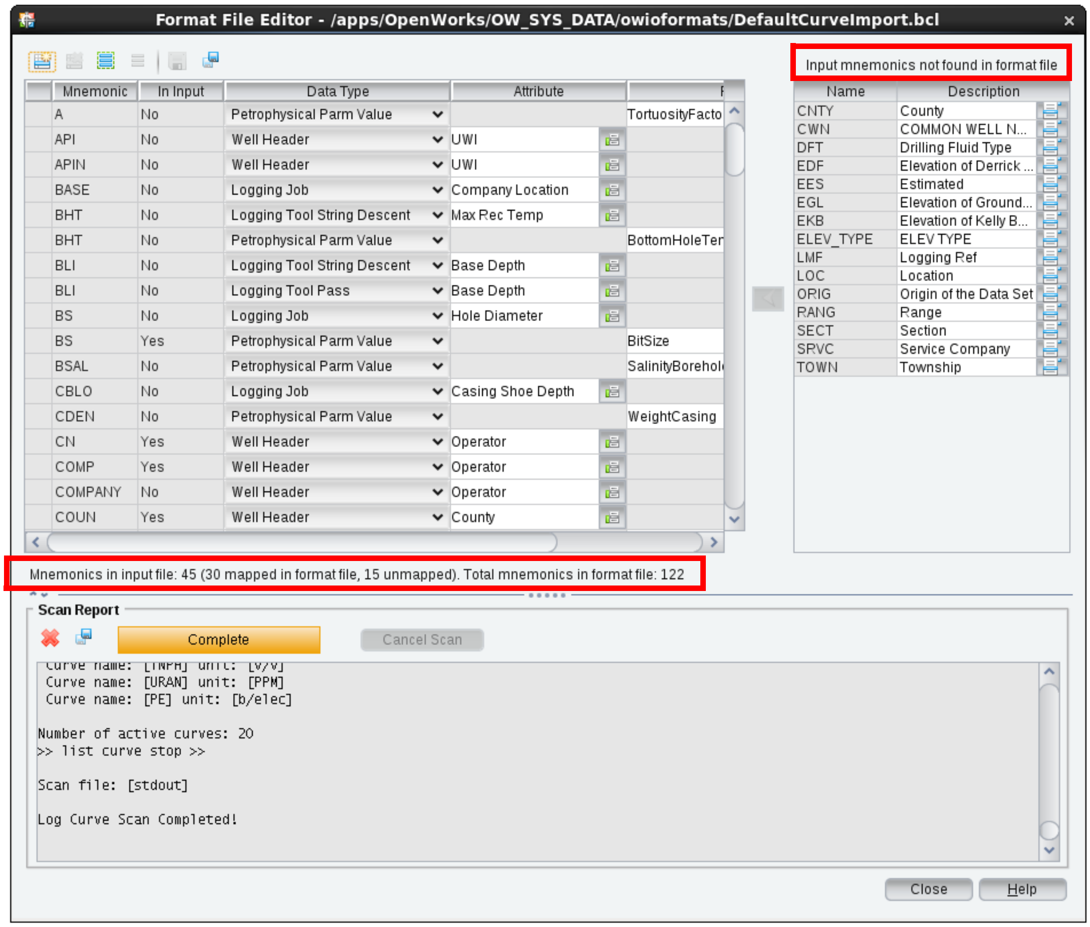


Notice in the above picture, that the format file named **DefaultCurveImport.bcl**, is automatically selected by the Data Import tool for mapping input file mnemonics to the OpenWorks database. If this format file does not relate to your input file, you can select a more suitable mapping file from the owioformats directory, or you can edit an existing format file and save the customized version to a new file name.

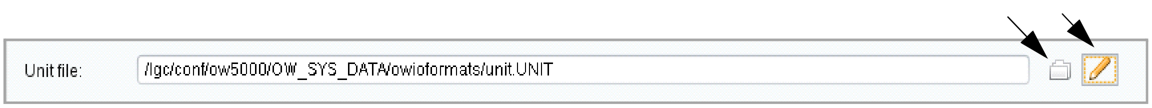
Click the **Pencil** icon to view or edit the format file in the Format File Editor. The Format File Editor has two main areas:

- The **Mnemonics** pane displays the format file mnemonics, and the OpenWorks table and field to which each mnemonic maps.
- The **Scan Report** pane displays the contents of the input binary curve files; a file scan starts automatically upon opening the Format File Editor.

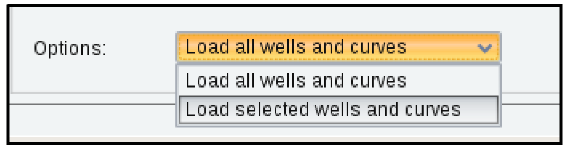
In the picture below, a status line indicates the number of mnemonics in the input file that are mapped in the format file as well as the number of unmapped mnemonics. A small box to the right of the Mnemonics pane lists the unmapped mnemonics. You can add these undefined mnemonics to the format and save the format file to a new file name.



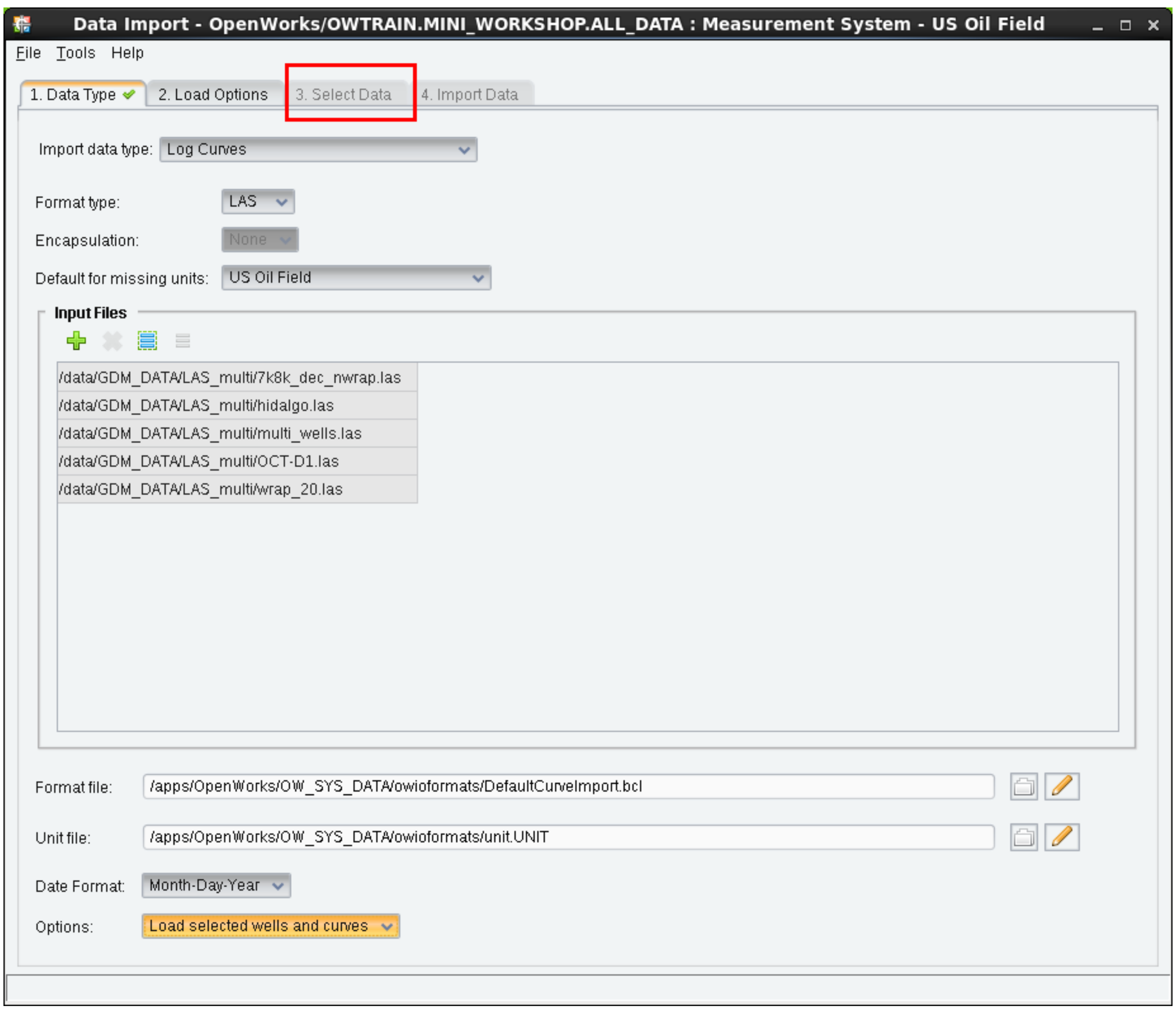
The default unit file for the Data Import tool is unit.UNIT. Click the icons next to the input field to see options for editing the unit file, or to select another unit file suitable for your input log file.



The Options menu offers two load options (below). The **Load selected wells and curves** option allows you to adjust the selection of the wells and curves to be loaded.

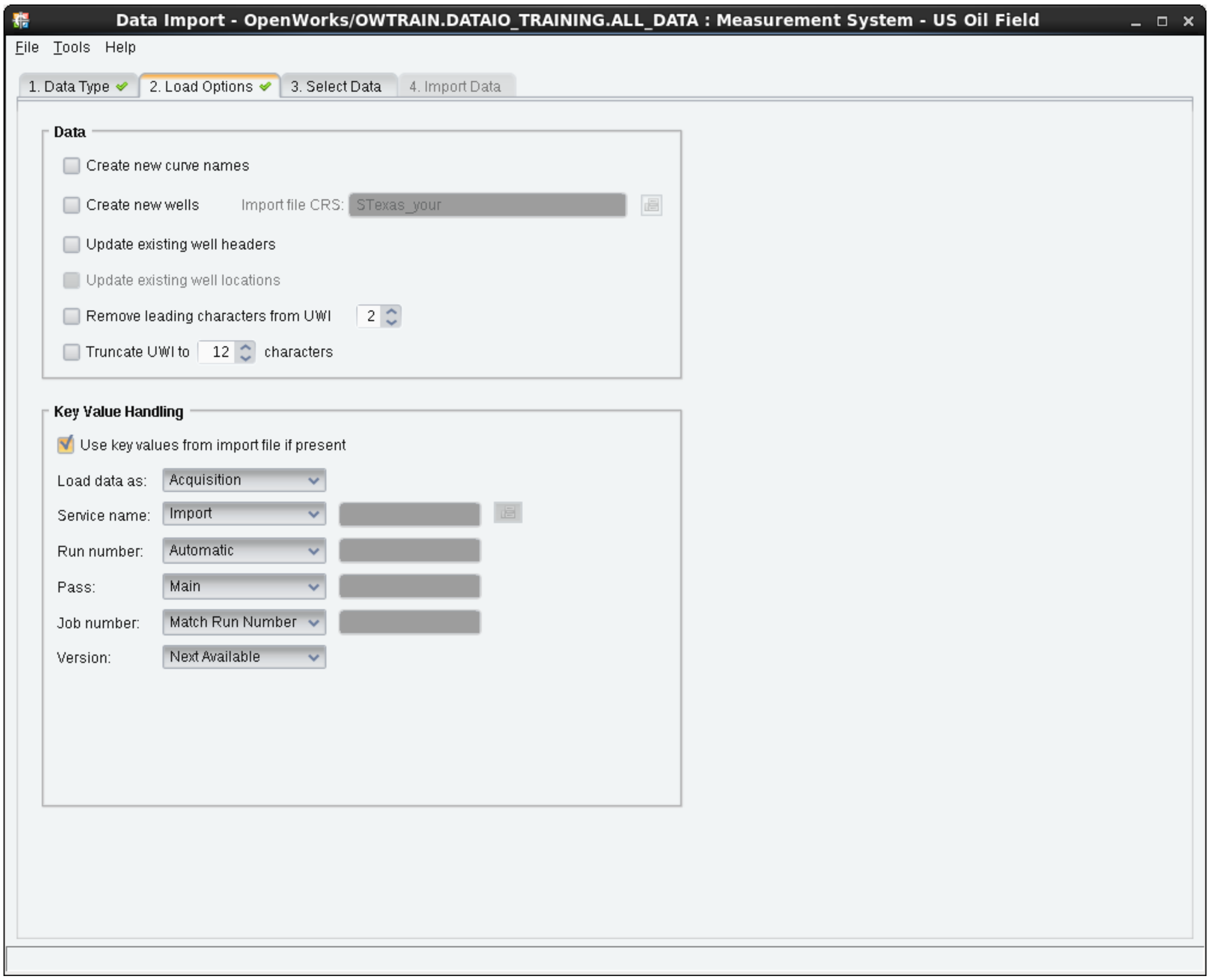


If you select the option **Load selected wells and curves**, the Data Import tool updates dynamically to include the Select Data tab window.



Setting the Load Options

After your input specifications are set you are ready to specify loading parameters in the Load Options tab window. The load option menu comprises two panes: Data and Key Value Handling.



The Data pane in the Load Options tab window offers the following options:

- Create new curve names—Add (or drop) invalid curves.
- Create new wells—Add (or drop) invalid wells.
- Update existing well locations—Updates based on well location UWI.
- Update existing well headers—Updates based on well UWI.
- Remove leading characters from UWI.
- Truncate UWI—Remove trailing characters from the well UWI.

If you elect to create new wells in the curve loading process, the CRS field is activated so you can specify the CRS of the input files.

> **Note:**
>
> When importing multiple log files in a single load, be sure all data files in the load share the same CRS.

The Key Value Handling pane offers curve identifier options when loading curve data. These identifier options are summarized in the following table.

Key value	Options			
Load data as:	Acquisition	Processed	—	—
Service name:	Import	Automatic	Constant Value	—
Run number:	Automatic	Composite	Next Available	Constant Value
Pass:	Main	Constant Value	Next Available	—
Job number:	Match Run Number	Next Available	Constant Value	—
Version:	Next available	1 (Clear Previous)	—	—

- **Acquisition data** is associated with a specific “pass” of a logging tool in the wellbore.
- **Processed data** is interpreted data, or cannot be associated with a specific logging tool pass.
- **Service name** is the trade name for the logging service or another name for the toolstring that generated the curve. This name may be an aggregate of the toolstring’s individual mnemonics. Service is a dictionary-controlled string (limited to 40 characters). Project Managers can change and delete service names through the OpenWorks Data Domain Manager.
- **Run number** is an OpenWorks serial counter on the number of toolstring descents for a specific, named service; each service can have multiple runs. The OpenWorks run does not necessarily

correspond directly to the run number reported during acquisition. When the run number is set to Automatic, it results in an overwrite of an existing curve in OpenWorks if key values match up. The run option, **Next available**, loads the curve with the run number incremented to the next available number.

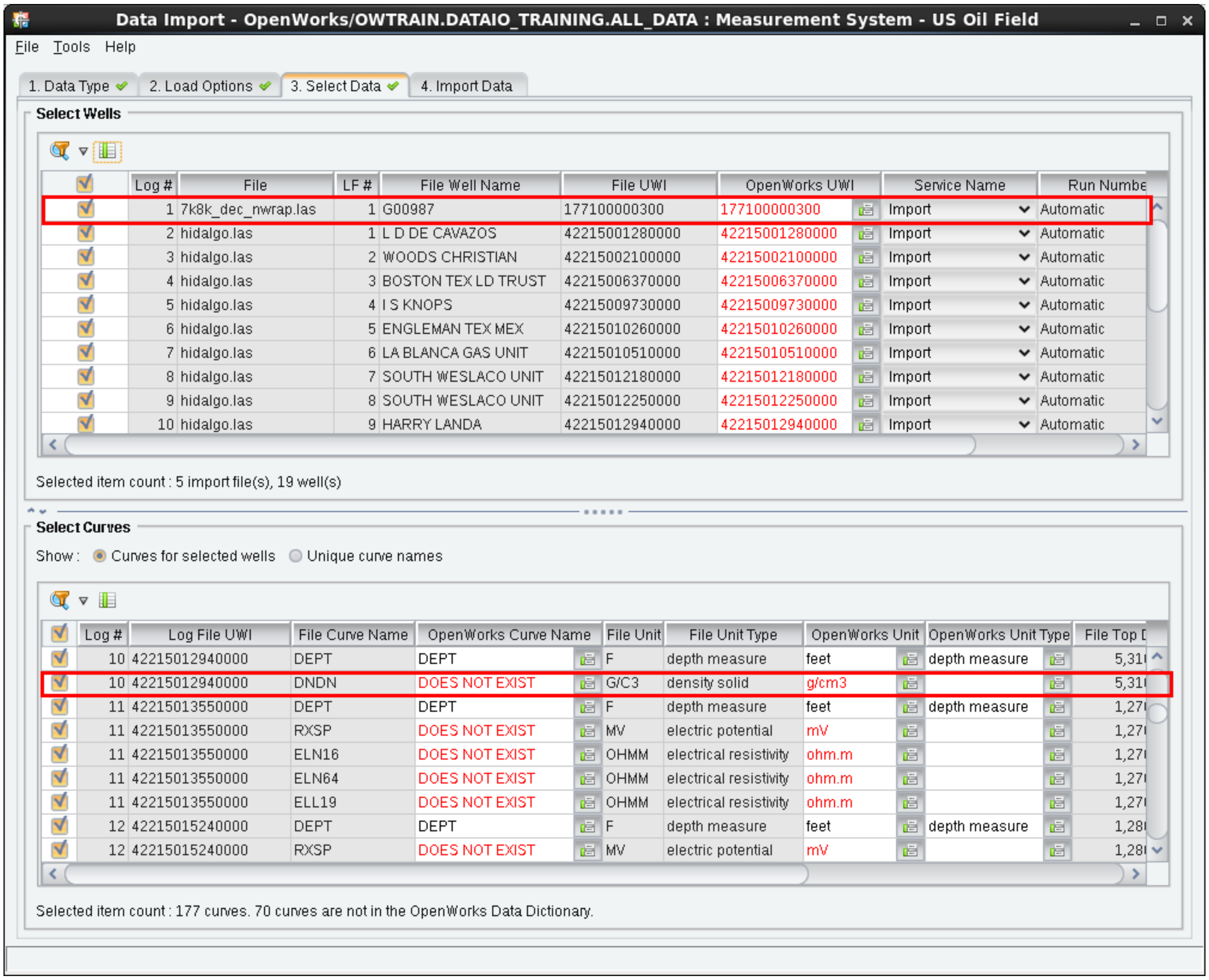
- **Pass** is a unidirectional movement of the toolstring in the wellbore.
- **Job number** is associated with the serial count of the number of trips to the well, characterized by data, service company, and so forth.
- **Version** is a serial counter under name, service, run, and pass. It is incremented if the curve is modified and the curve name is not changed.

Setting the Select Data Options

If the **Load all wells and curves** option was selected, you can proceed directly to the Import tab window. If you chose the **Load selected wells and curves** option in the Data Type tab window, you can specify the wells and curves you want to import in the Select Data tab window.

The Select Data tab window contains two tables populated with the wells and curves from the input data files. By default, all wells and curves are toggled on. You may modify the selections according to your loading needs.

Note that wells not existing in the OW project are shown in red font in the OpenWorks UWI field. Curve units that do not exist in the OpenWorks Curve Dictionary are displayed in red font in the OpenWorks Unit field (below).

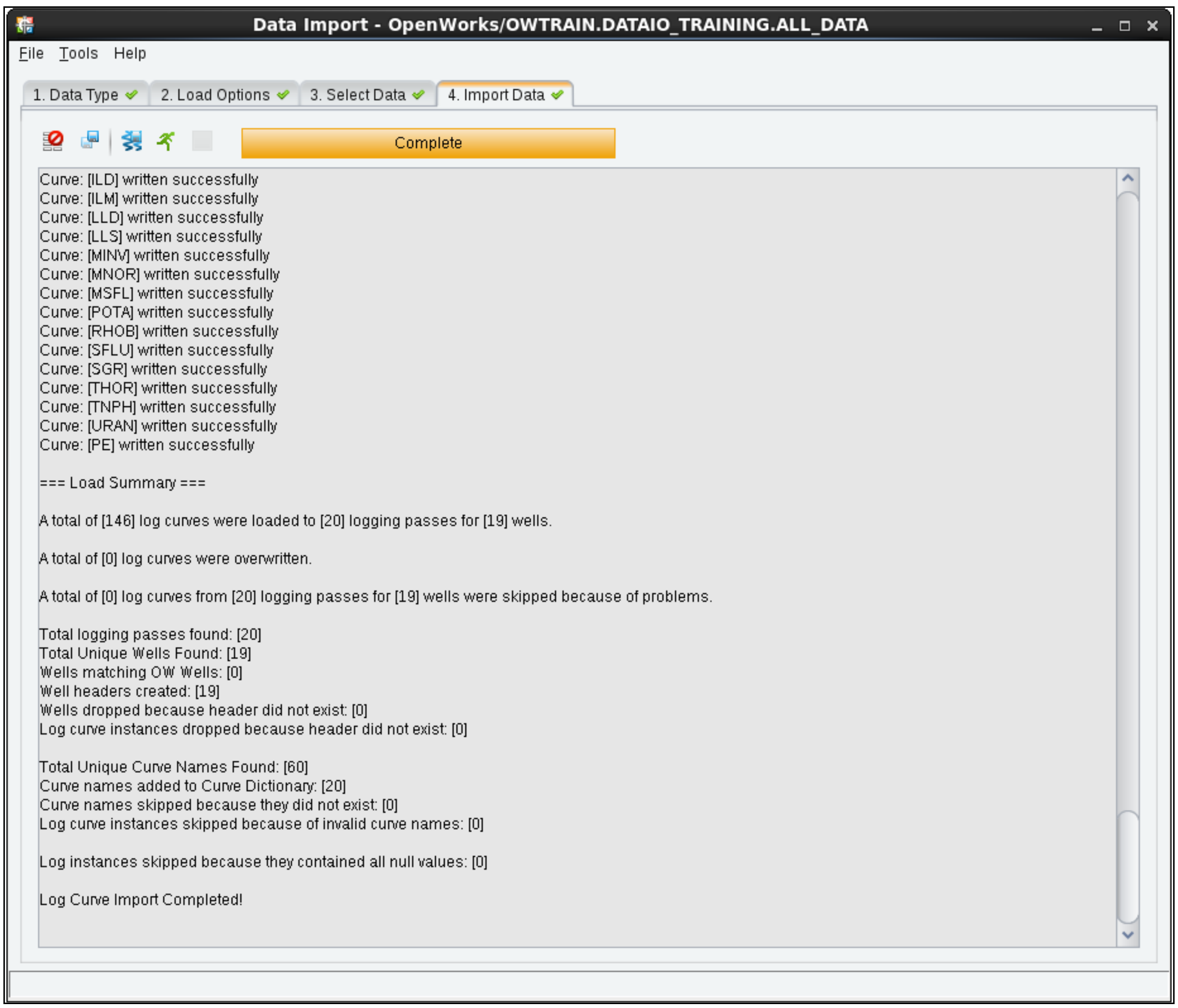


If the unit file (selected in the Data Type tab window) does not contain an entry for the unit, or the file unit mnemonic is not in the Curve Dictionary, no unit will be loaded with the data unless you select a valid unit from a drop-down menu of OpenWorks units. Alternatively, you can edit the unit file (unit.UNIT) to include the unit of your curve prior to curve loading. When OpenWorks detects the curve unit in either the unit file or the Curve Dictionary, the curve unit is displayed in blue font in the OpenWorks Unit field of the Select Curves table and it will be loaded to the OpenWorks database with the curve data in the import process.

Loading the Log Curve Data

In the Import tab window, the **Import** icon starts your curve load. When the load is complete, the Load Summary will be written to the status window. It is good practice to always check for the following information:

- Total log curves loaded
- Total log curves overwritten
- Total log curves skipped
- Wells created
- Wells dropped
- Log curves dropped because header did not exist
- Logs dropped due to null values



You can save the Load Summary report to a text file for later perusal or report documentation.

Exercise 7-5. Loading Multiple LAS Curves

This exercise shows how to load multiple LAS log curve files with the Data Import tool. You can select specific wells, curves, and units during the import process.

1. Make sure the project **DATAIO_TRAINING** is still selected. If it is not, use the Project Status tool to change the project.

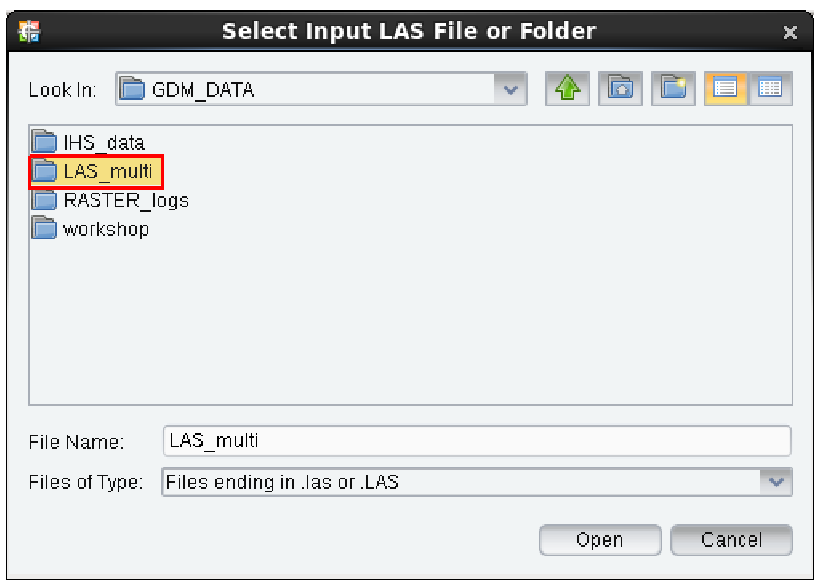
2. On the OpenWorks command menu, select **Data** > **Import** > **Data Import** to initialize the Data Import tool.

3. By default, the Data Type tab will be active. Select **Log curves** from the **Import data type** drop-down menu.

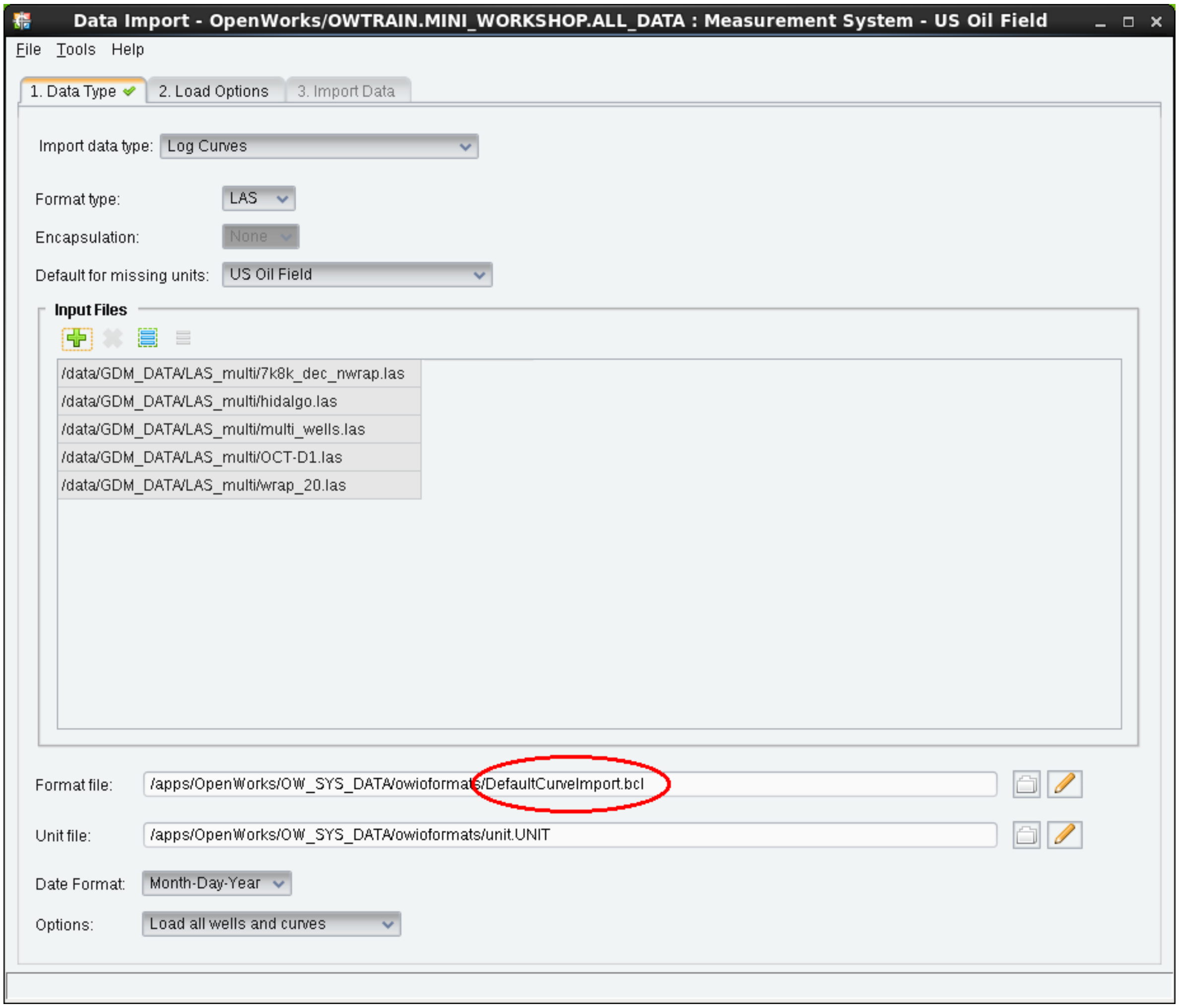
4. **LAS** is the default selection for **Format type**. Accept this default.

5. Click the **Add Files** icon to open the Input File Selection dialog box.

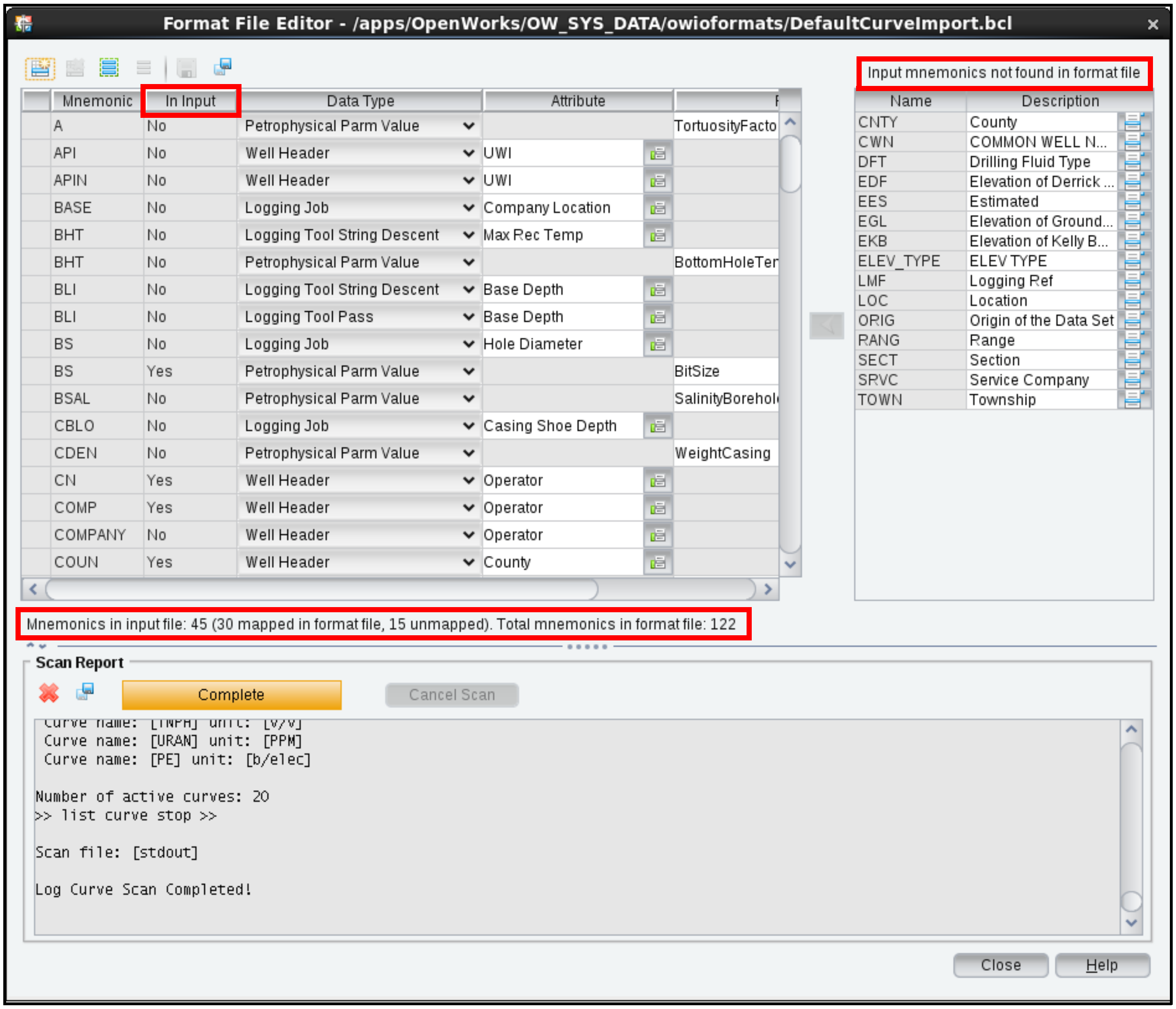
6. Browse to the training data directory and select the folder **LAS_multi.** The File Name field will contain “LAS_multi.”



When you click **Open**, all the LAS files in the **LAS_multi** folder are written to the Input Files box in the Data Import tool. Notice that the LAS files are displayed with their directory paths.



7. Accept the default format file **DefaultCurveImport.bcl**. Click the **Pencil** icon to review the contents of the input and format files in the Format File Editor. Notice that when the Format File Editor opens up, the Scan Report window shows a file scan in progress.



Examine the information available in the Format File Editor. The file scan detected 45 mnemonics in the input data files, where 30 of these are mapped in the format file. The Mnemonics table lists all of the format file mnemonics, indicating their mapped status with the In Input column. The unmapped mnemonics are listed in the small box to the right of the Mnemonics pane. You can add the undefined mnemonics to the format, enter mapping parameters, and save the edited format file to a new file name.

8. Click **Close** to exit the Format File Editor.

9. In the Data Type tab window, accept the defaults for the unit file and date format.

10. Click the drop-down menu next to **Options,** and select **Load selected wells and curves**. This allows you to specify curves from the LAS files in the Select Data tab window.

11. Click the Load Options tab window. In the Data and Key Value Handling panes, select the following options:

    Data options:

    •Toggle on **Create new curve names**

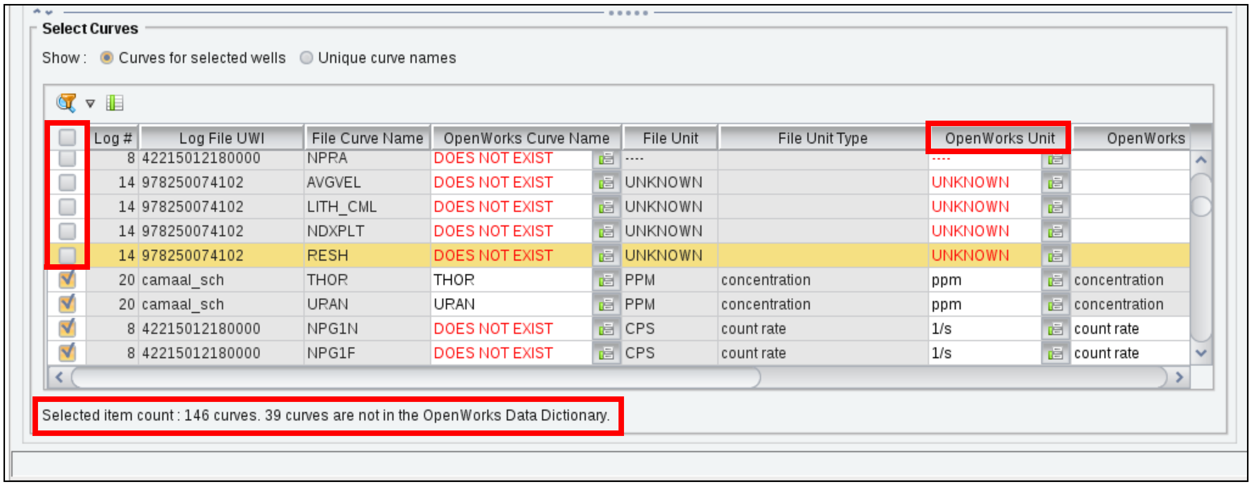
    •Toggle on **Create new wells**

    •Select **STexas_XXX** for Import file CRS

    Key value options: Accept the **default settings**.

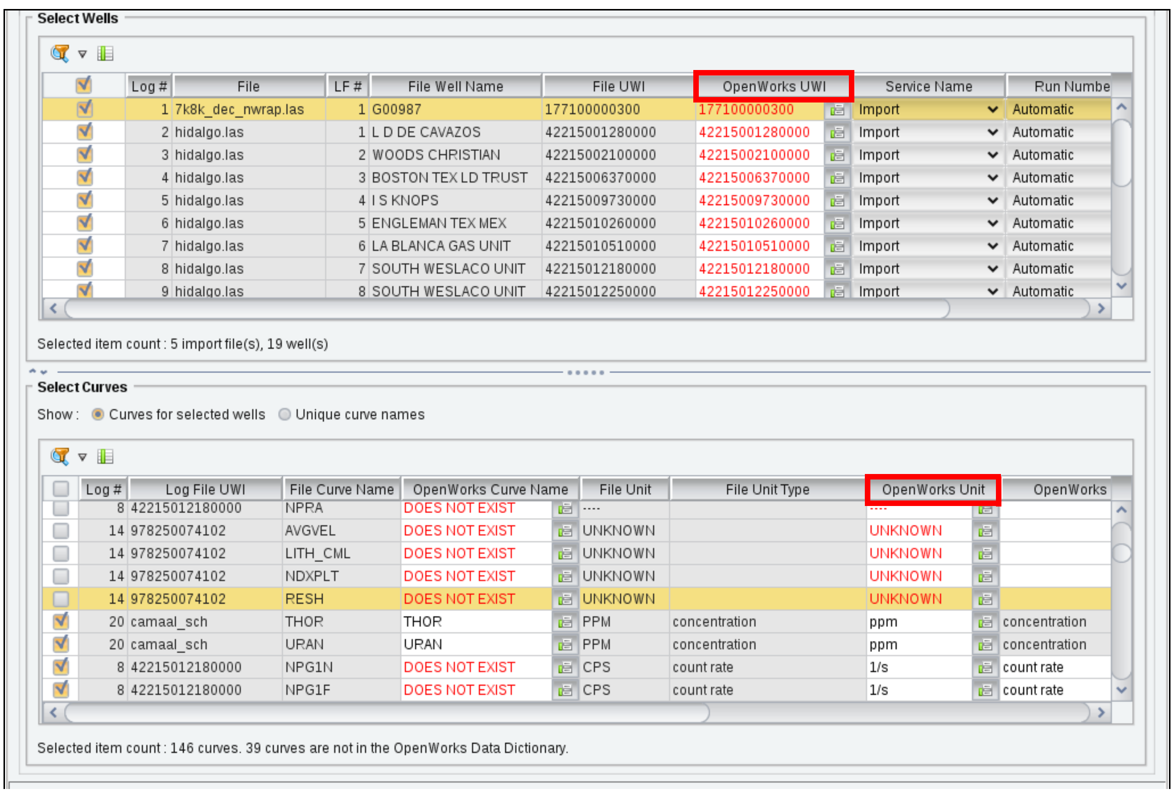
12. The Select Data tab window shows two tables populated with the wells and curves from the input data files. By default, all wells and curves are selected for import.

For this load, you will deselect certain curves with missing information. Click the column heading **OpenWorks Unit Type** to sort the fields in that column. Deselect the curves where the OpenWorks Unit Type is missing or UNKNOWN by toggling off the check mark. Your curve selection table should look like this:



A total of 146 curves are selected for the load job.

Note that invalid wells are indicated by red font in the OpenWorks UWI column. Curve units that do not exist in the OpenWorks Curve Dictionary, display red font in the OpenWorks Unit column.



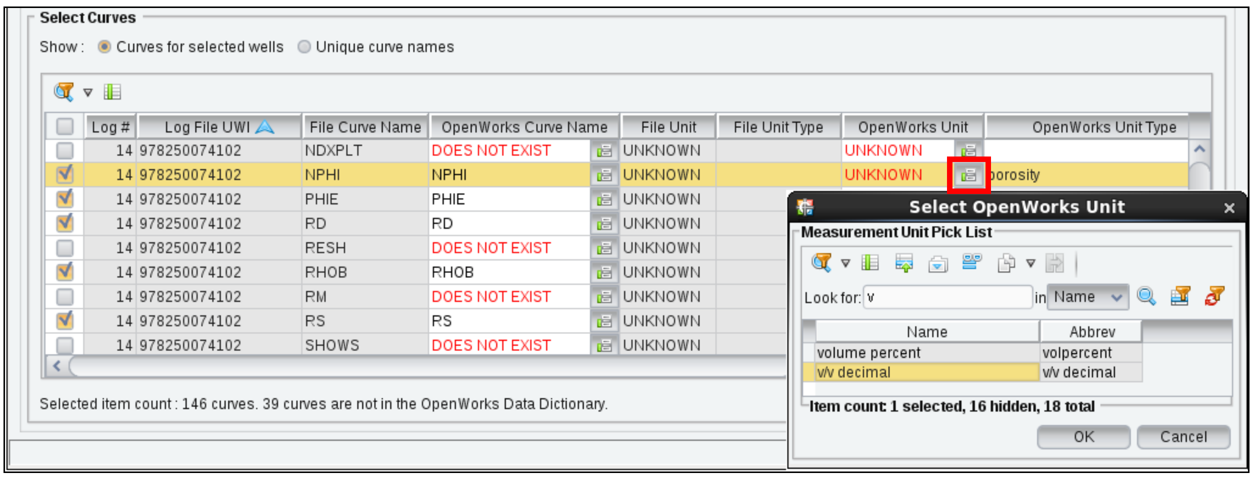
13. For curves with unknown units, you can select valid units from a drop-down menu in the OpenWorks Unit field.

    - Scroll down the **OpenWorks Unit Type** column to where all the porosity curves in the input files are listed.

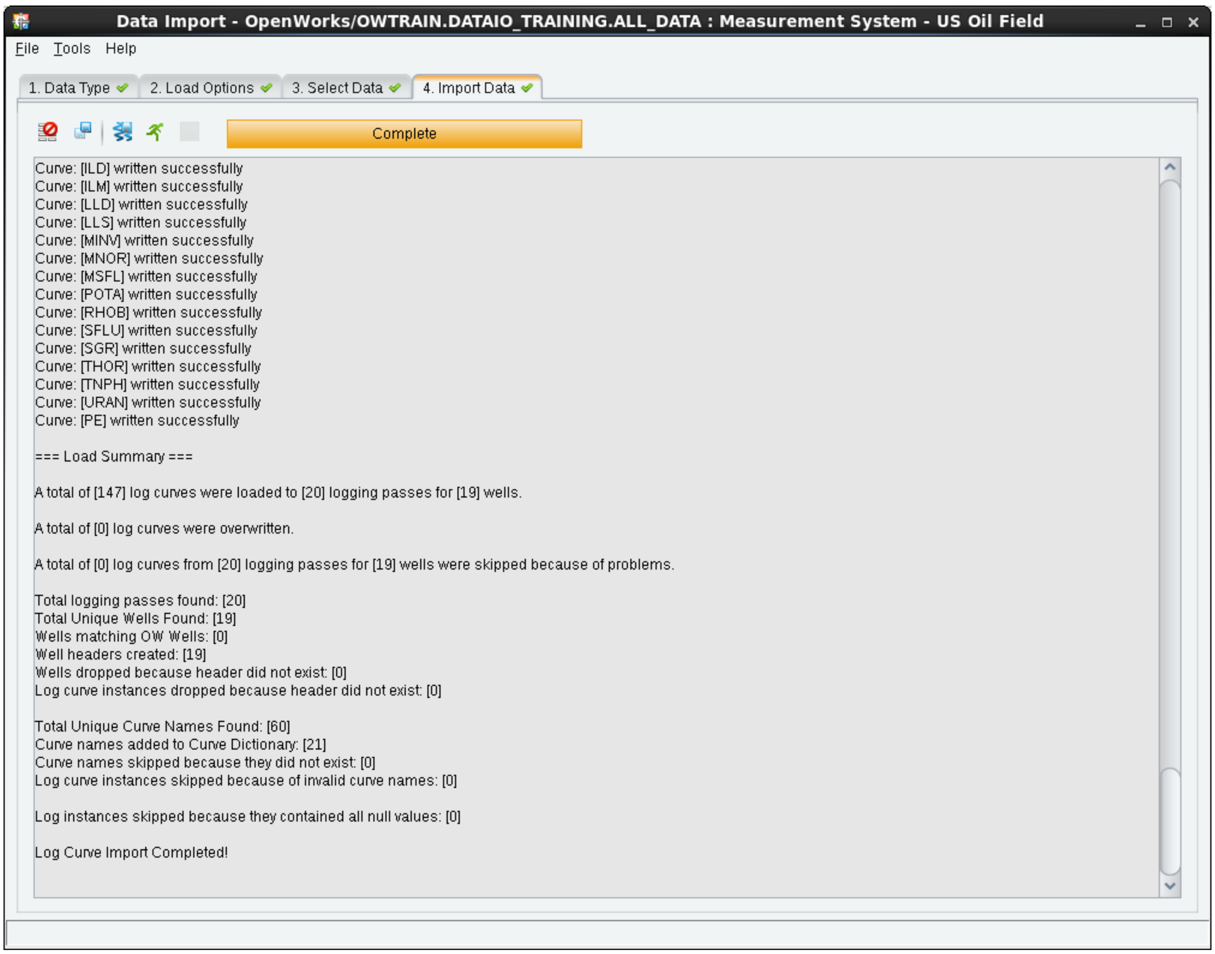
    - For each porosity curve, click the drop-down menu for the **OpenWorks Unit** field; use the filter to isolate, and then select **v/v decimal** in the selection box.

    - Click **OK**. The valid unit will have blue font in the Curves table.

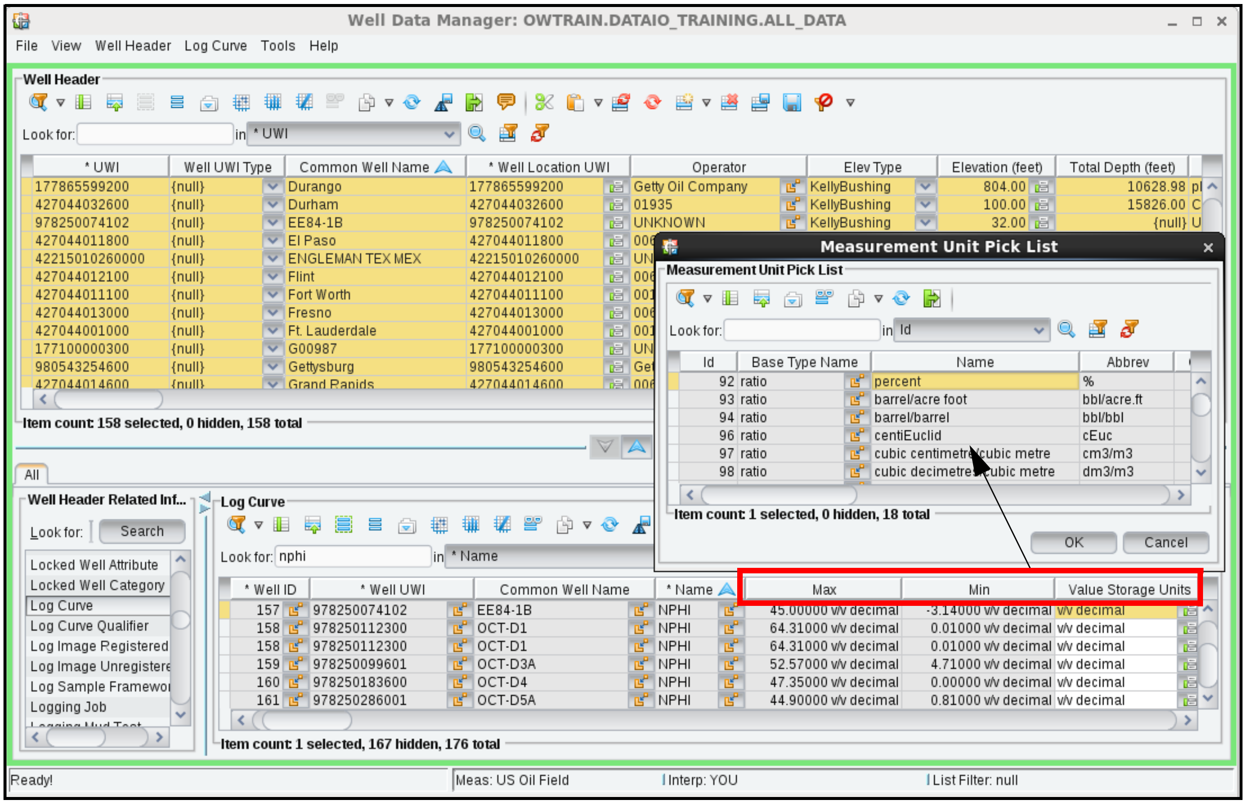
    - Repeat this process for the other porosity curves you wish to import.



14. In the Import tab window, click the **Import** icon  to run the import job. When the load has completed, the Load Summary will be written to the status window. Your load summary should look like the following image.



15. QC the **porosity data** in Well Data Manager. Filter the Log Curve table for NPHI curves. Examine the value range for each NPHI curve. If the porosity range is 0 to 1.0, then “v/v decimal” is the correct Value Storage Unit.



However, you can see that the NPHI value range is 0 to 100 for these porosity curves; therefore the unit should be “%.”

- Click the drop-down **menu** in the Value Storage Units field and select **Percent**.
- Click **OK**.
- Repeat this process for each **NPHI curve**.
- Click **Save**.

Repeat this QC process for the **PHIE** and **VSHMIN** curves. What porosity range do they have? Do you need to make unit corrections?

16. Open the Well Curve Viewer. Select **File > Read all.**

17. Select one of the above wells and the **NPHI curve** in Well Curve Viewer. Set the Scale to **Crv Dict**. Toggle between **Session Units** and **Storage Units.** Notice the difference in the curve display due to unit selection.

18. Exit Well Data Manager and Well Curve Viewer.

Chapter 8

Managing Surfaces, Faults, and Strat Units

The Surface/Fault Data Manager provides a convenient way to add surfaces, faults, and stratigraphic units to the OpenWorks software database. These entries appear in other OpenWorks applications, such as Well List Manager, as well as in other Landmark applications, such as DecisionSpace Geosciences, StratWorks, SeisWorks, and PetroWorks software.

Chapter Objectives

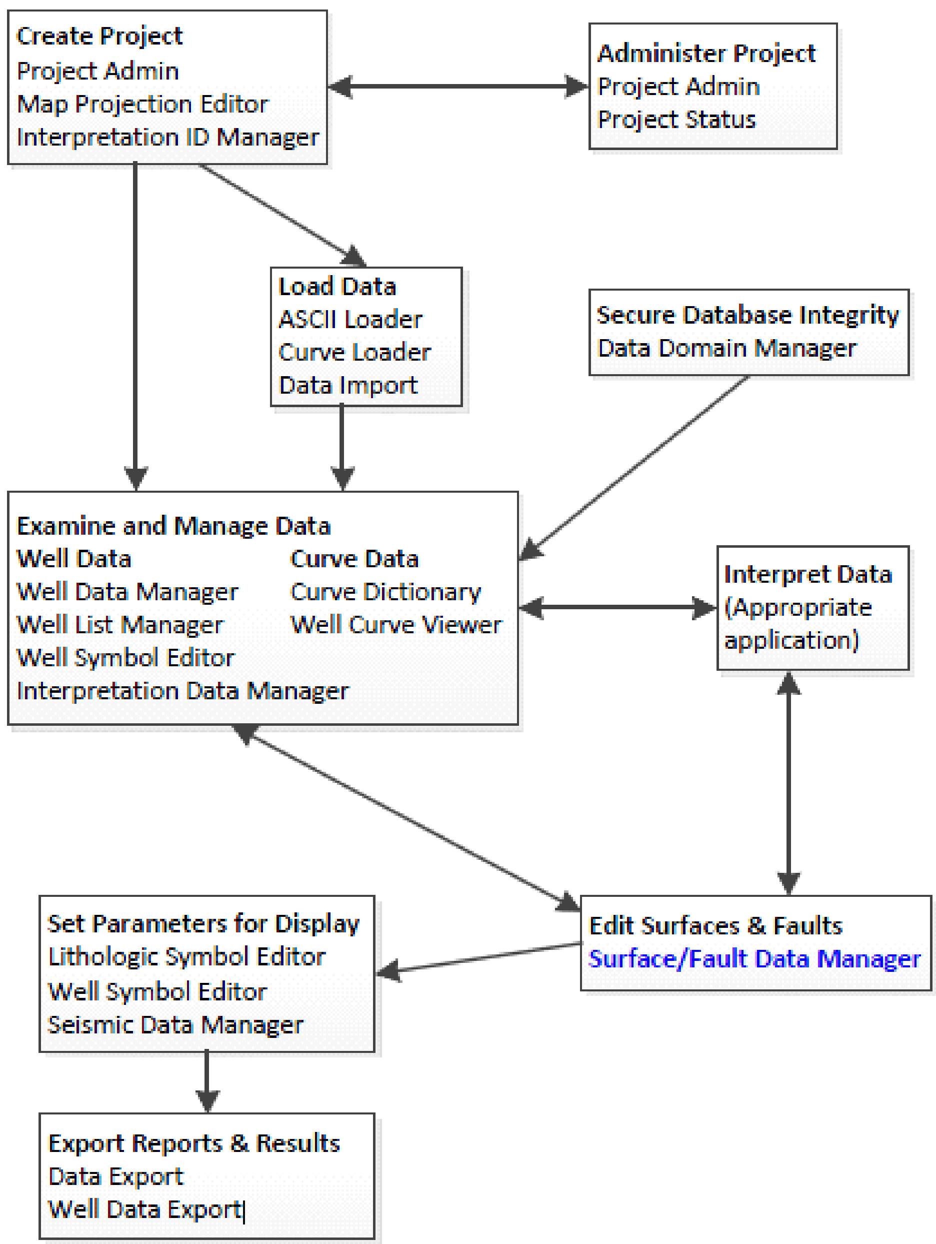
This chapter discusses the Surface/Fault Data Manager's features and provides instructions on how to use them.

In this chapter, you will learn how to:

- Create new surfaces, faults and strat units
- Delete surfaces, faults, and strat units
- Add, modify, and delete display options

Surface/Fault Data Manager Workflow

The Surface/Fault Data Manager is used after you create a project and load data into the project. Your loaded data is then used to define surfaces (picks), strat units, and faults prior to their use in interpretations or calculations, in Landmark applications.



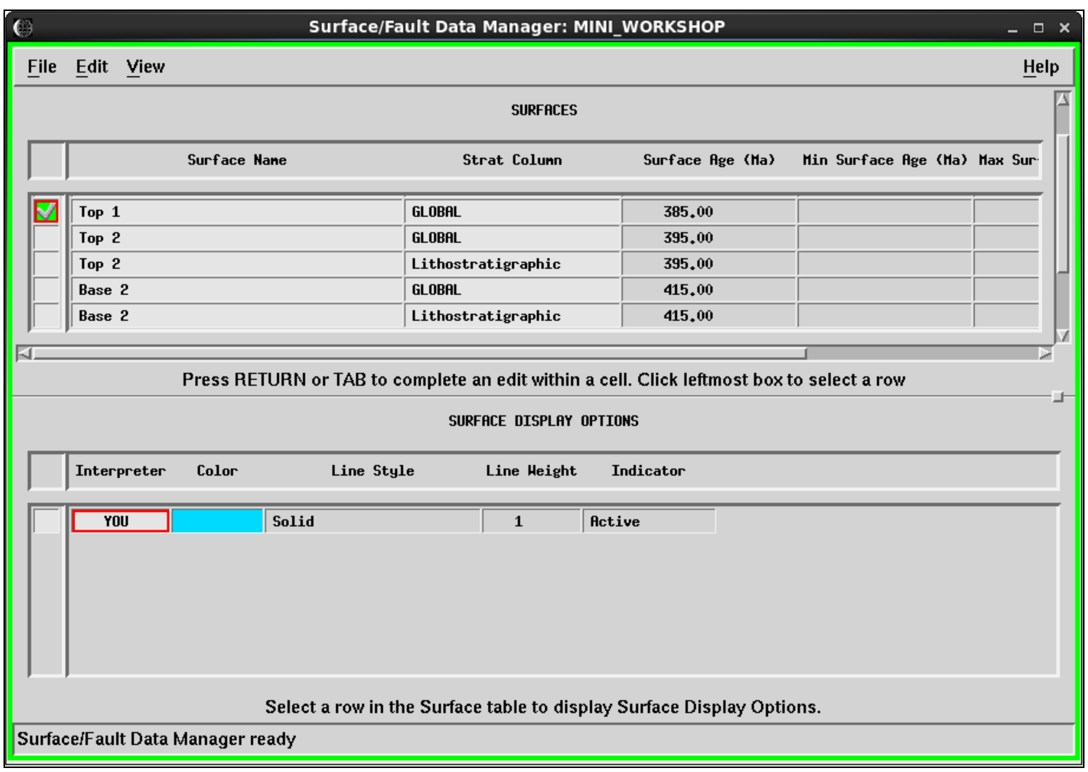
Surface/Fault Data Manager: An Introduction

The Surface/Fault Data Manager performs the same tasks as the StratWorks utility, Strat Column Editor. Whereas the Strat Column Editor displays data graphically, the Surface/Fault Data Manager displays information in a spreadsheet format, as rows and columns of data, which is conducive to editing large volumes of data.

In the Surface/Fault Data Manager tables, each row corresponds to a surface, fault, or strat unit in the stratigraphic column. Surfaces are listed in increasing chronological age from top to bottom, faults are listed alphabetically, and strat units are listed chronologically by top surface age.

To add or modify surfaces, faults, and strat units, you must add and edit rows in the corresponding spreadsheet. When you save your work, the Surface/Fault Data Manager rearranges the rows appropriately.

The Surface/Fault Data Manager main window is shown here.



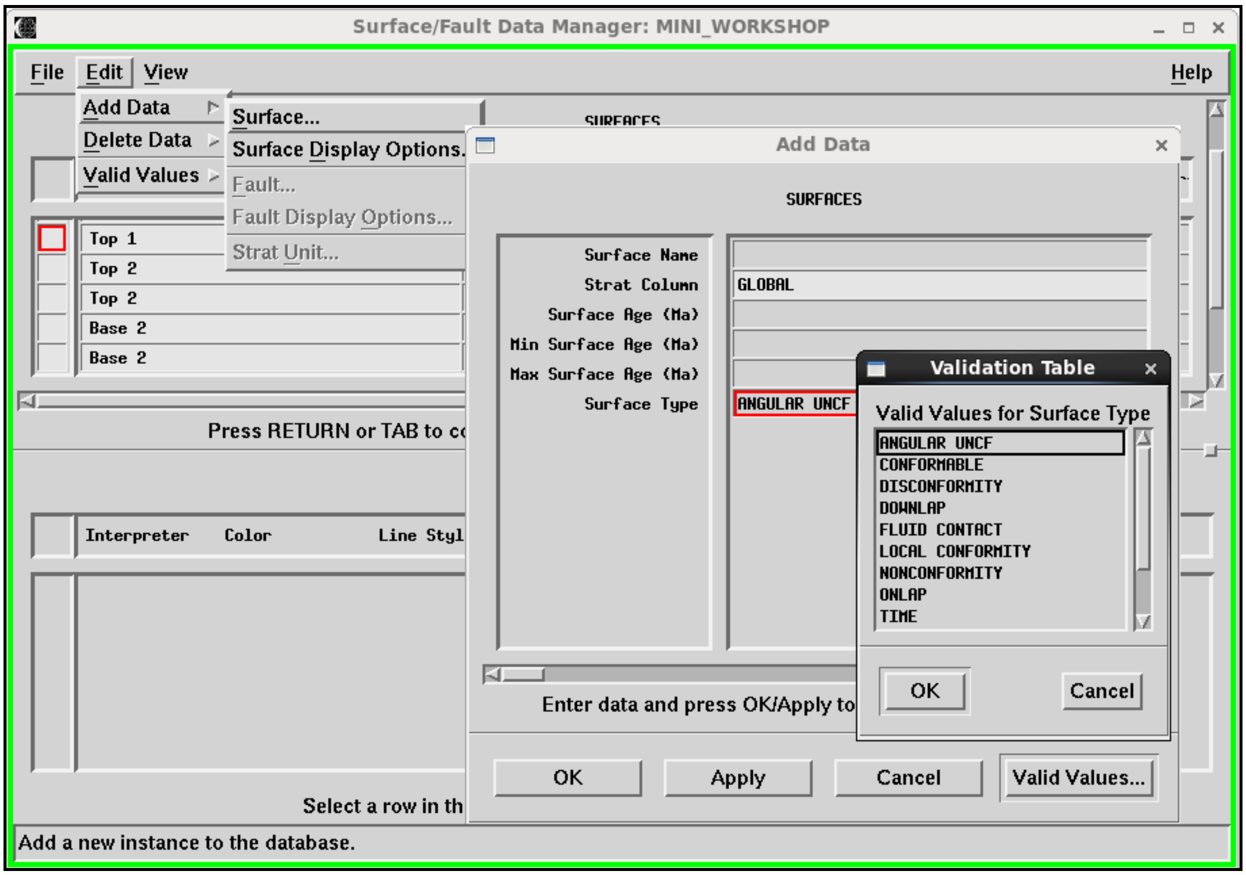
The default view is the Surfaces table. You can change the display to the Strat Units or Faults spreadsheet by selecting **View** > **Strat Units**, or **View** > **Faults.**

Adding Surfaces

A surface is an interpretable event. After a surface is interpreted at a given well, it is called a pick.

1. To create a surface, select **Edit > Add Data > Surface**.

2. In the Add Data dialog box, type a **Surface Name** if you are defining a new surface, or select **Valid Values** to access a list of picks already in the database, but not yet defined as surfaces in the OpenWorks project.



3. Enter a relative **Surface Age**.

4. Select the **field** next to Surface Type, then click **Valid Values…** to select the surface type from the Validation Table.

5. Click **Apply** to add the surface definition to the database.

6. Repeat steps 1 – 5 for each surface you want to create.

7. Click **OK** or **Cancel** to close the dialog box.

8. Click **File > Save** to save surface definitions.

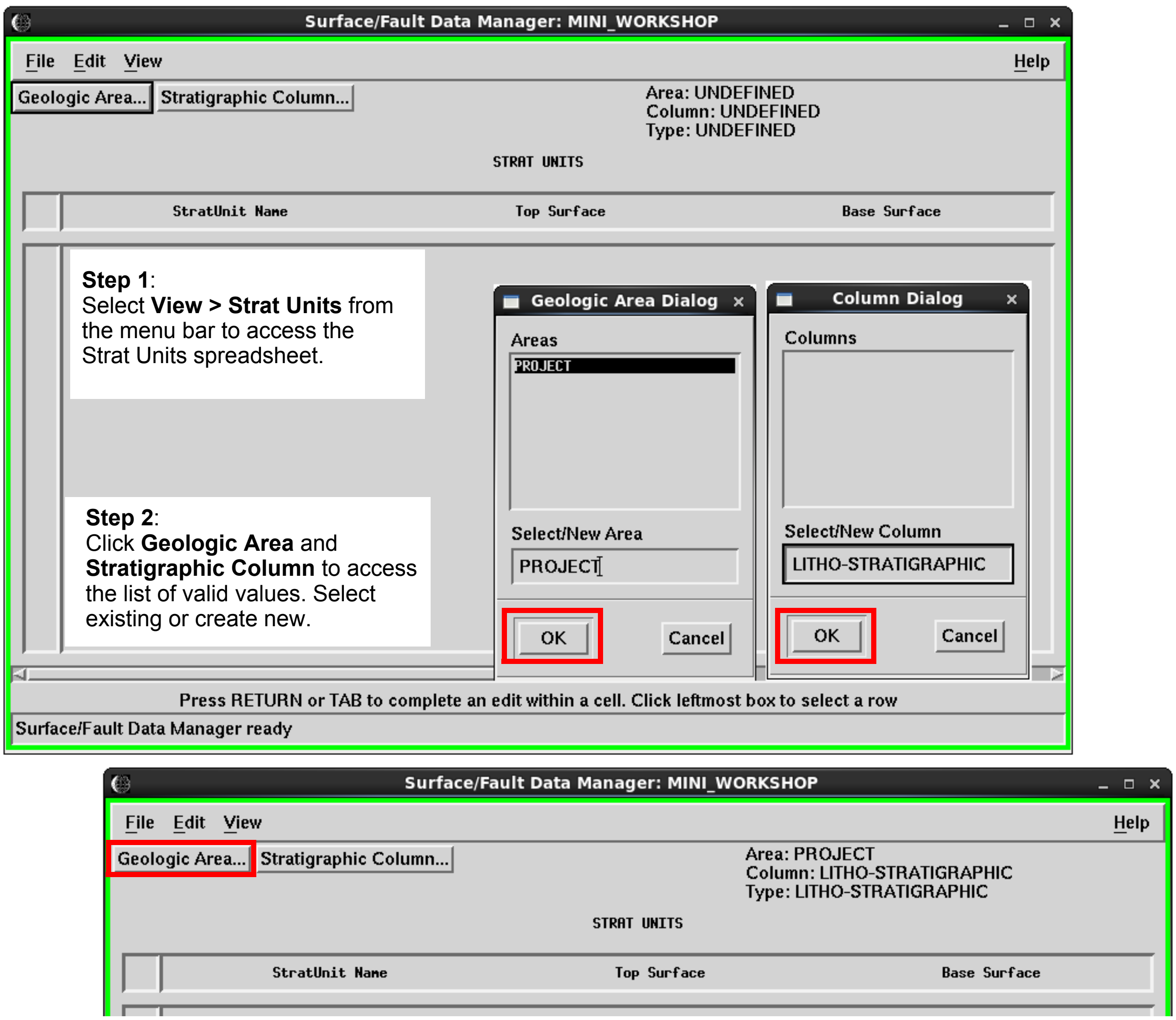
   Age must be in mega-annums (millions of years). The **Valid Values** button displays appropriate entries for Name and Type. For instance, if the cursor is in the Surface Name field, Valid Values displays a list of picks that are in the database but have not been defined as surfaces. If the cursor is in the Surface Type field, Valid Values displays a list of valid surface types (conformable, disconformity, nonconformity, and so forth).

Adding Strat Units

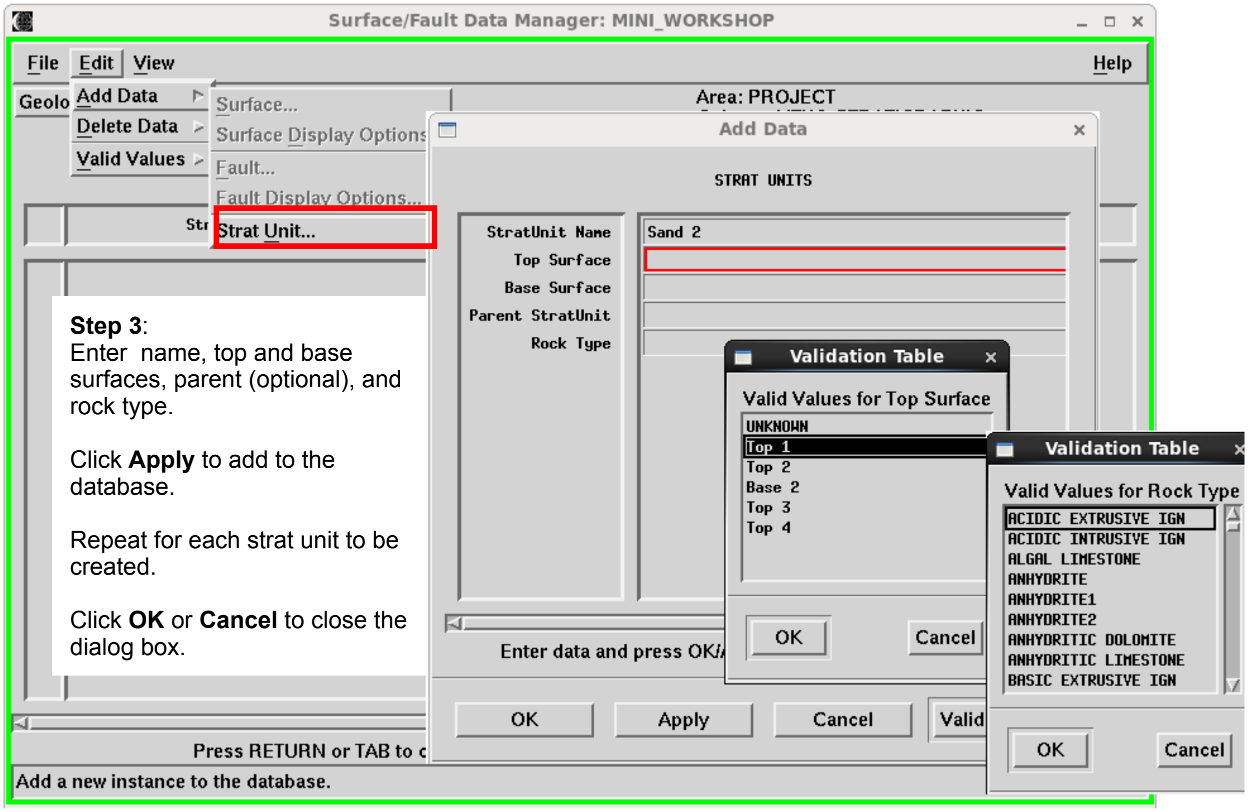
A stratigraphic unit is the interval between two surfaces. Strat units are defined by four parameters:

- Top/bottom boundaries, which must be defined surfaces
- Parent unit to which it belongs (optional)
- Rock type of the unit
- Stratigraphic unit to which it belongs

Use the following procedure to create a strat unit.



When the strat units spreadsheet is active and you have selected a column, you are ready to add strat units. Select **Edit > Add Data > Strat Unit**.

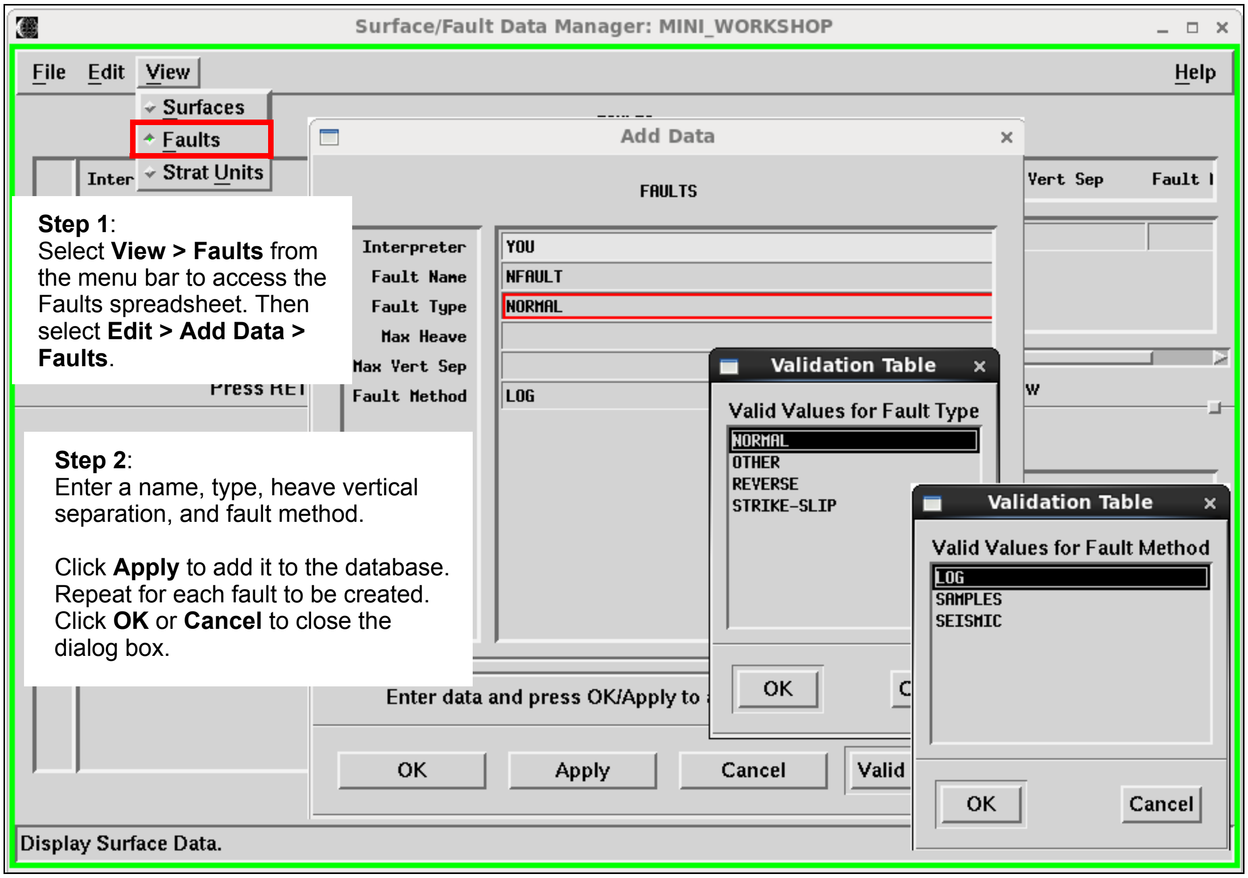


Note:

Click the **Valid Values** icon to display appropriate entries for each field for which it is selected. For example, you can click the **Top Surface** or **Base Surface** field to display a list of surfaces already in the database.

Adding Faults

A fault is the line of intersection between a surface and a fault plane. Use the following procedure to add a fault.

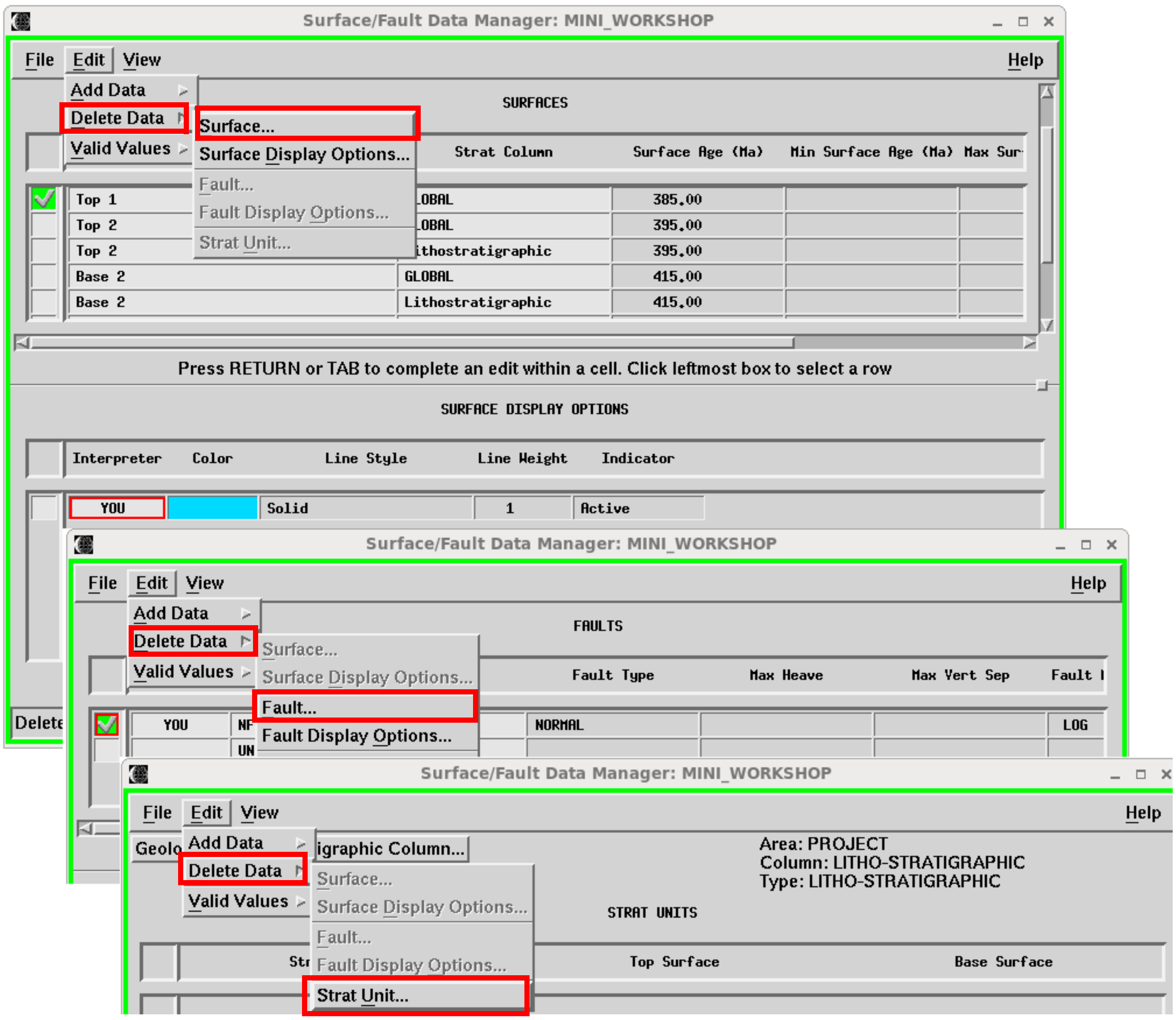


Note:

Click the **Valid Values** icon to display appropriate entries for each field for which it is selected. For example, you can click the **Fault Type** field to display a list of valid fault types, such as Normal, Reverse, and so forth.

Deleting Surfaces, Strat Units, and Faults

To delete surfaces, strat units, or faults, select the desired **View** option, click the **left-most box** in the row of the feature to be deleted, then select the appropriate **Edit > Delete Data** option.

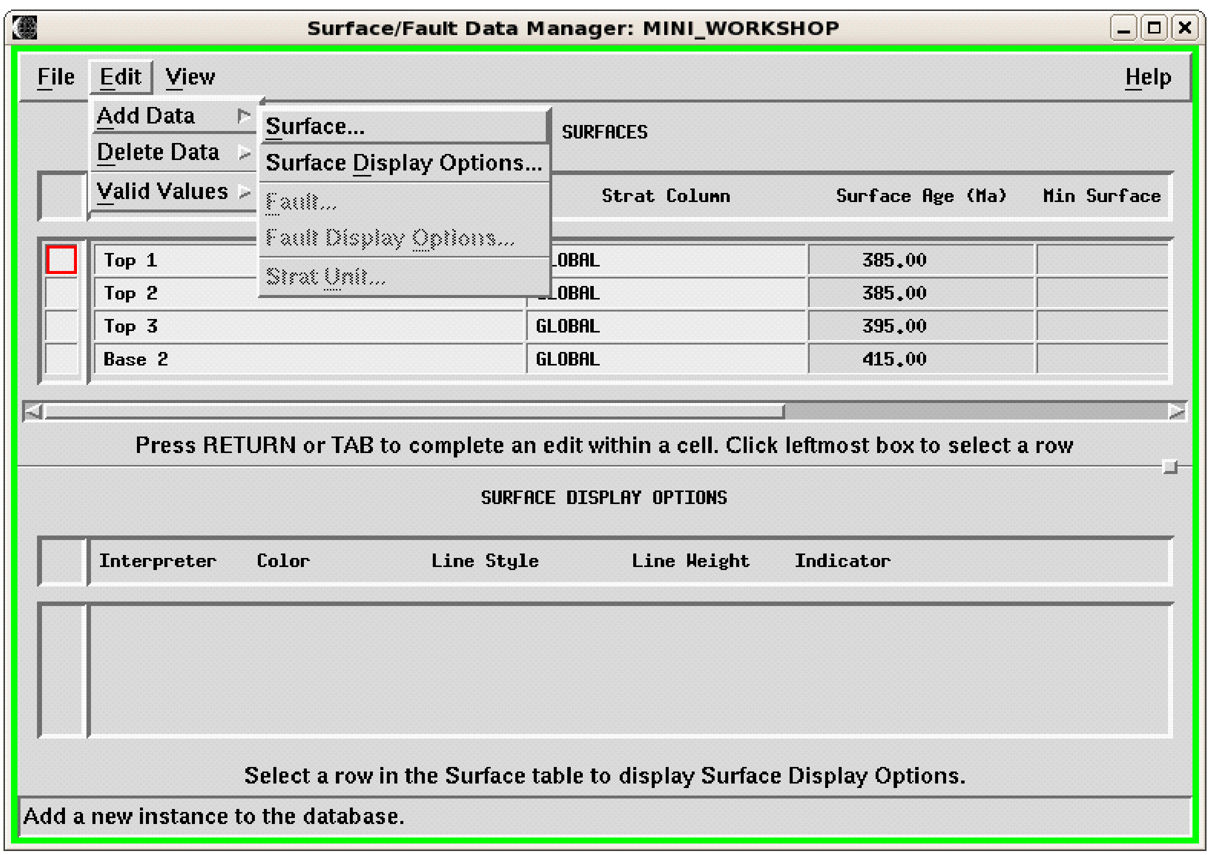


Adding Surface (or Fault) Display Options

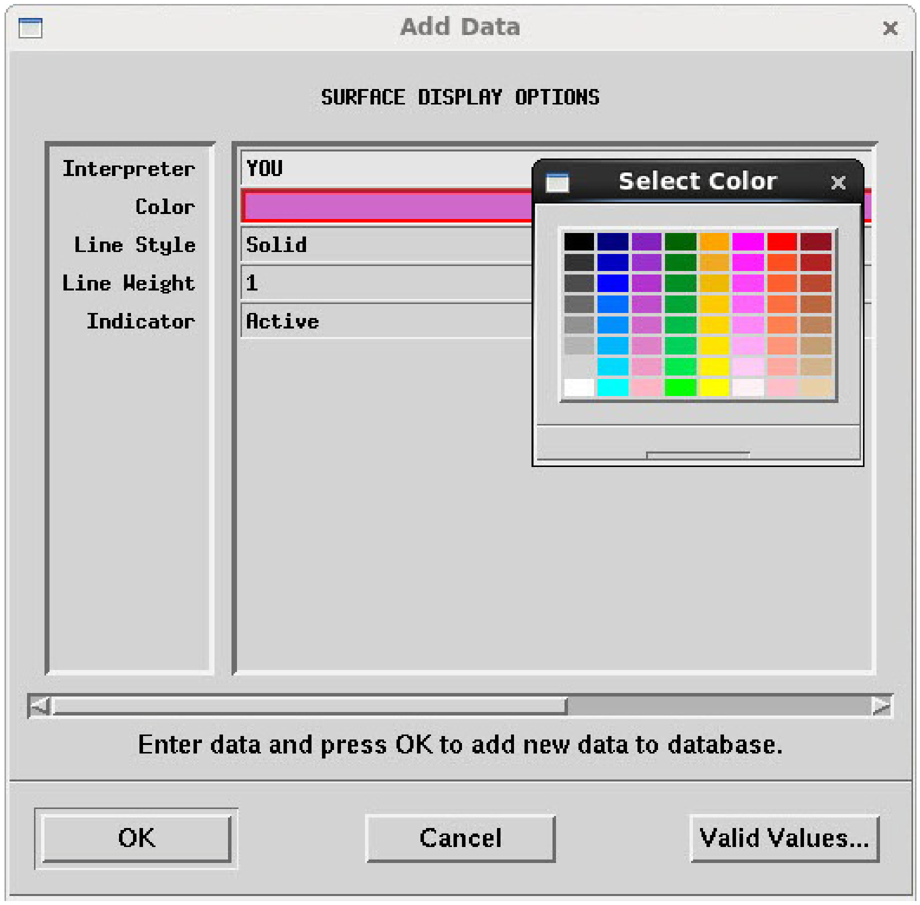
When you create a surface or fault, the Surface/Fault Data Manager sets default options that control graphical displays by Landmark applications. These display options are automatically associated with the current interpretation ID.

You can define your own display preferences for each surface or fault. You can set new display options only for the current interpretation ID. If you wish to add display settings for other interpretation IDs, you must first reset the current interpretation ID, using the **Project > Project Status Tool** command.

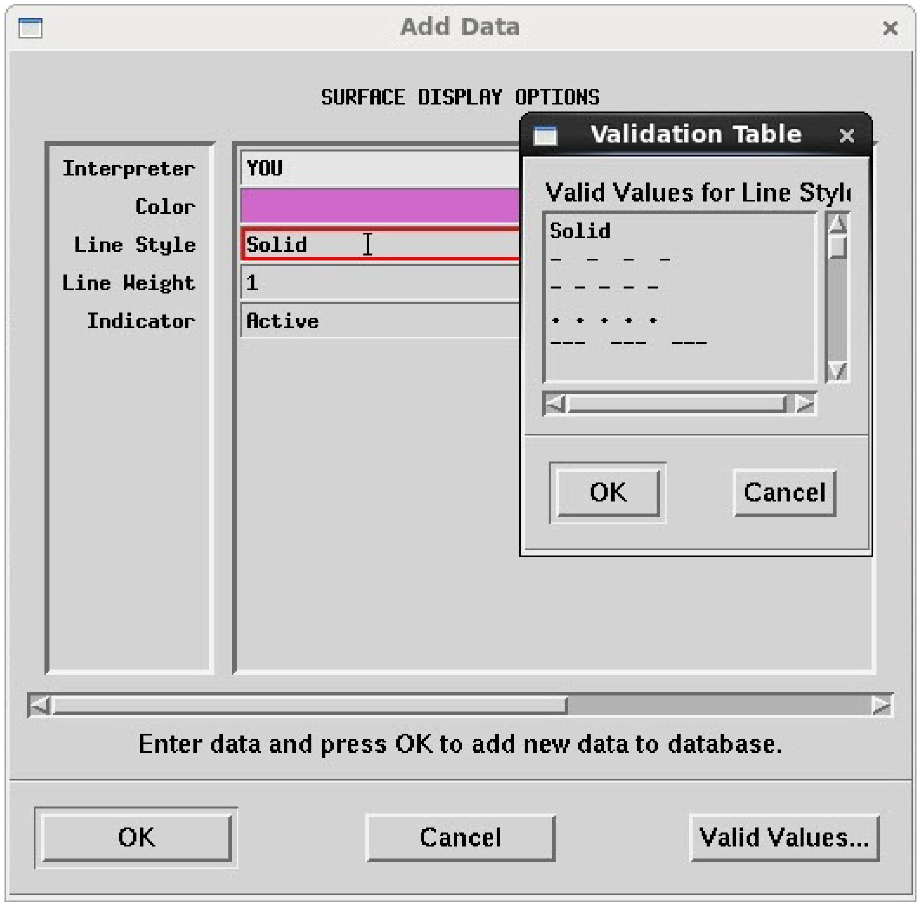
1. Select **Edit > Add Data > Surface (Fault) Display Options** to open the Add Data dialog box.



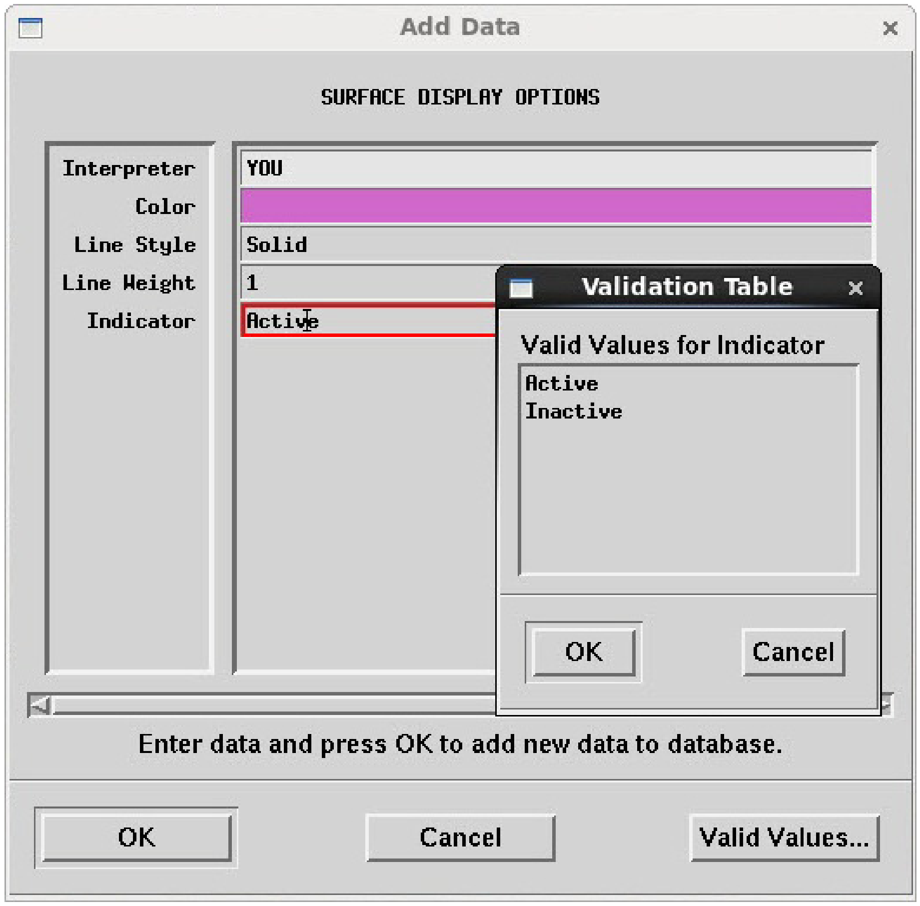
2. Enter a color, line style, line weight, and indicator from the validation tables for the selected surface. The Current Interpreter is selected by default.



3. Click **OK** or **Cancel** to display the appropriate entries for each field.

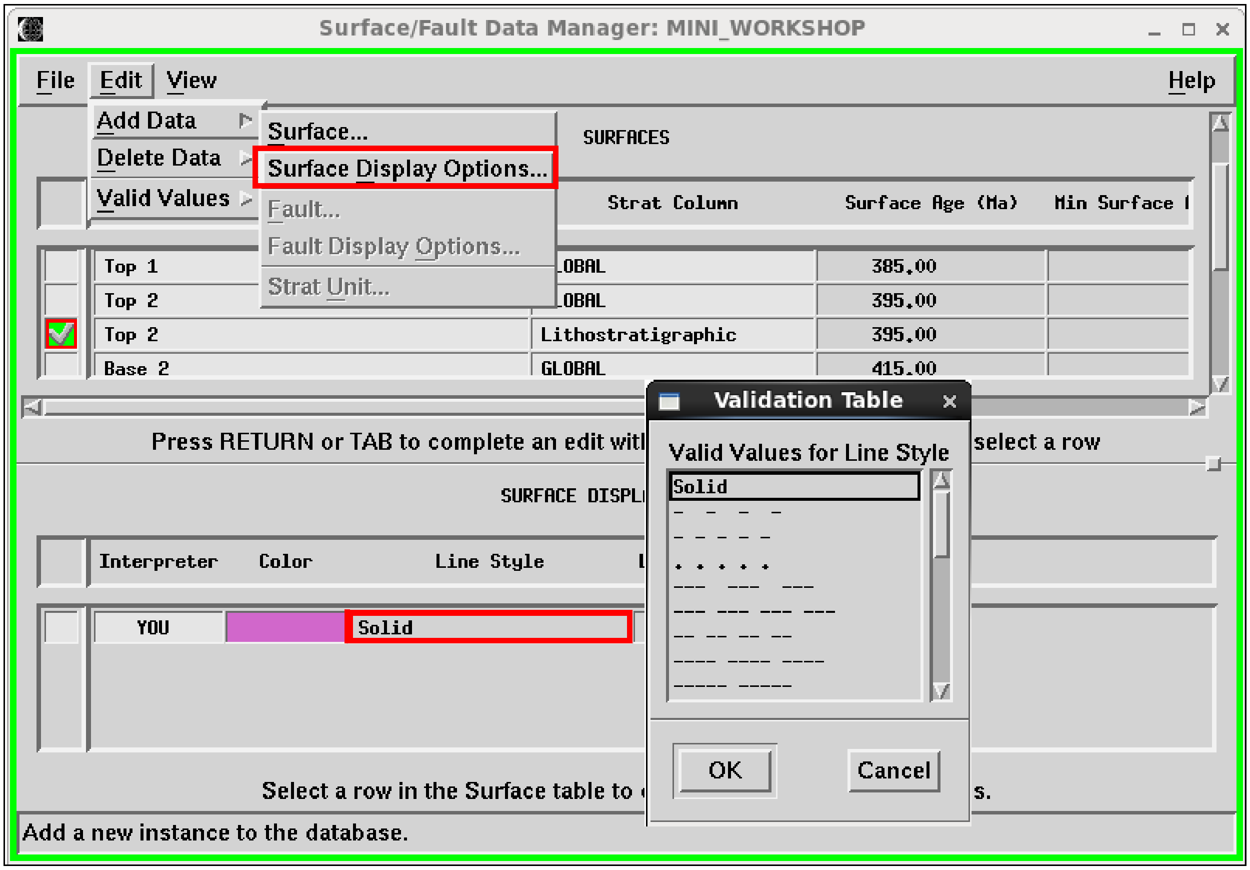


4. In the Indicator field, click **Valid Values** to display a list of valid indicators. The Active/ Inactive option determines whether the surface will be active in Landmark applications.

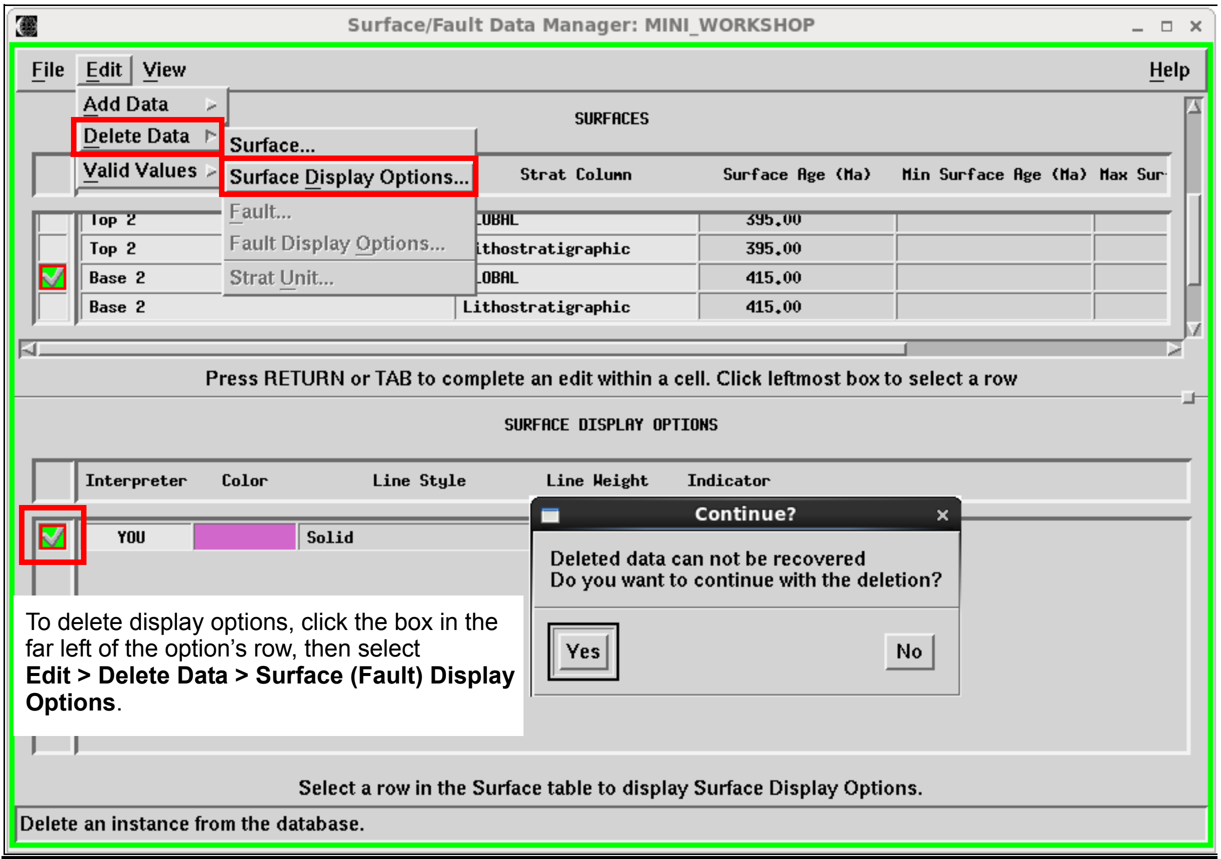


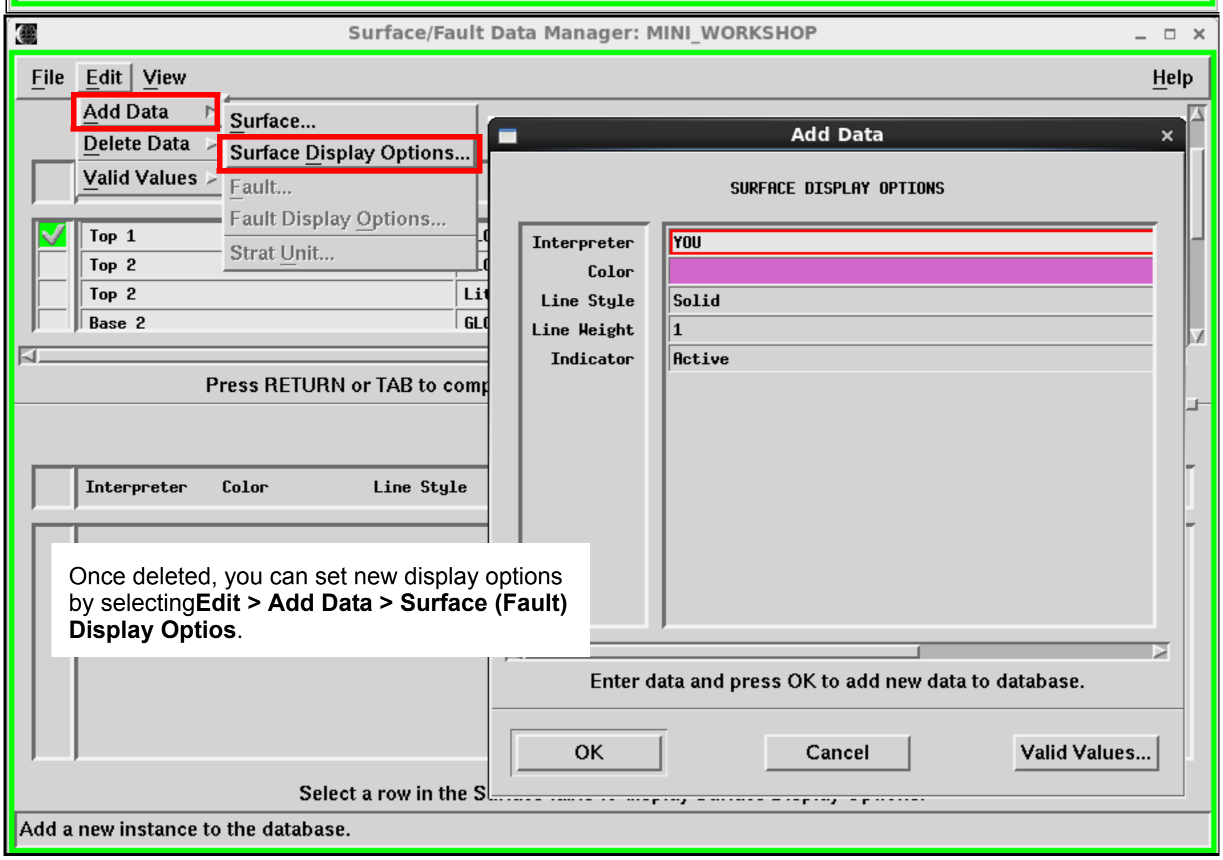
Modifying and Deleting Display Options

You can modify or delete existing display options for surfaces and faults. You can change individual display settings such as color or line weight. You can also delete display settings for the selected interpreter. After all current display settings are deleted you can select **Edit > Add Data > Surface (Fault) Display Options** to define new display settings.



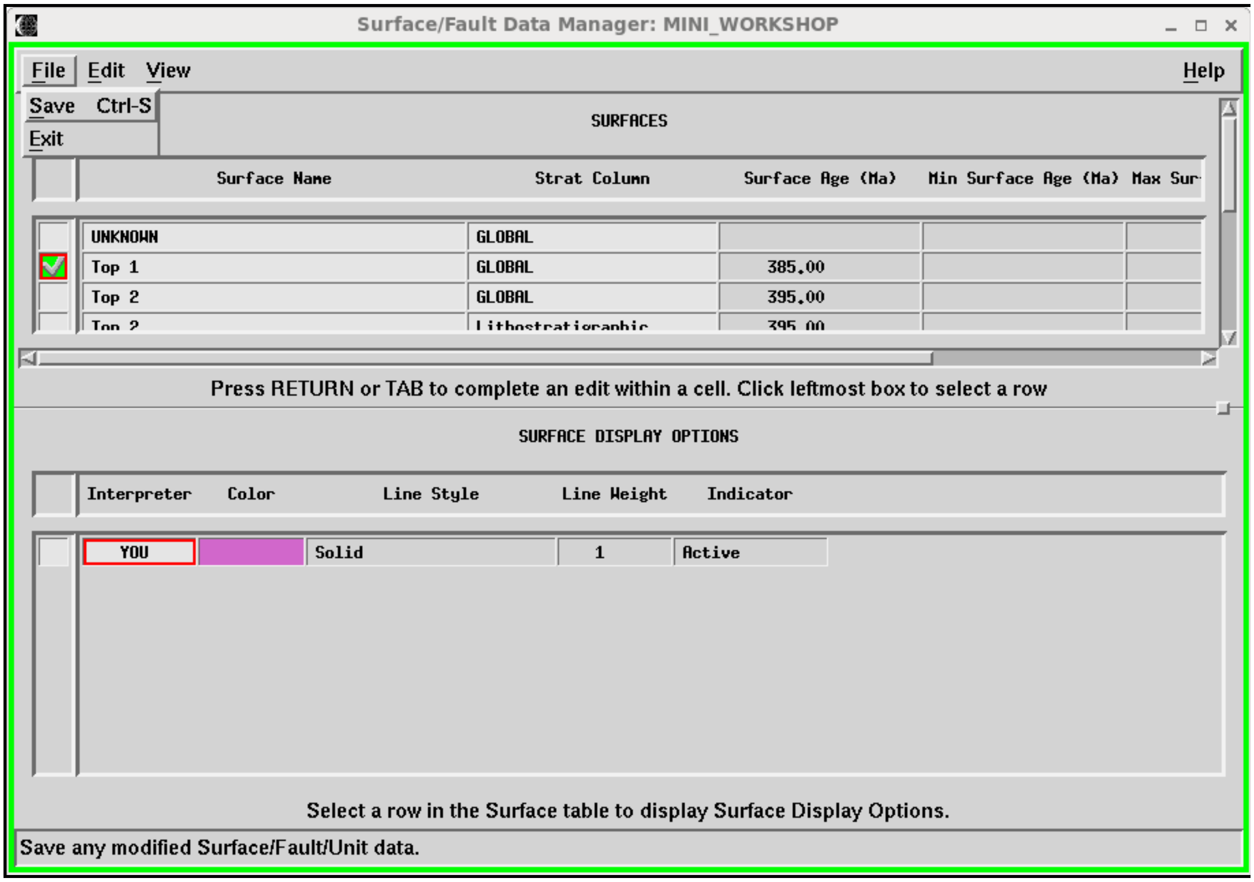
To modify existing display options, click the option to modify (Line Style, in this example), and select **Edit > Valid Values > Surface (Fault) Display Options**. Select the replacement of your choice, then click **OK**.


Surface/Fault Data Manager: MINI_WORKSHOP
File Edit View Help
Add Data
Delete Data
Valid Values
Surface...
Surface Display Options...
Fault...
Fault Display Options...
Strat Unit...
SURFACES
Strat Column Surface Age (Ma) Min Surface Age (Ma) Max Sur
Top 2 GLOBAL 395.00
Top 2 Lithostratigraphic 395.00
Base 2 GLOBAL 415.00
Base 2 Lithostratigraphic 415.00
Press RETURN or TAB to complete an edit within a cell. Click leftmost box to select a row
SURFACE DISPLAY OPTIONS
Interpreter Color Line Style Line Weight Indicator
YOU Solid
Continue?
Deleted data can not be recovered
Do you want to continue with the deletion?
Yes
No
To delete display options, click the box in the far left of the option's row, then select **Edit > Delete Data > Surface (Fault) Display Options**.
Select a row in the Surface table to display Surface Display Options.
Delete an instance from the database.


Surface/Fault Data Manager: MINI_WORKSHOP
File Edit View Help
Add Data
Delete Data
Valid Values
Surface...
Surface Display Options...
Fault...
Fault Display Options...
Strat Unit...
Top 1
Top 2
Top 2
Base 2
Press RETURN or TAB to comp
Interpreter Color Line Style
Add Data
SURFACE DISPLAY OPTIONS
Interpreter YOU
Color
Line Style Solid
Line Weight 1
Indicator Active
Enter data and press OK to add new data to database.
OK
Cancel
Valid Values...
Once deleted, you can set new display options by selecting**Edit > Add Data > Surface (Fault) Display Optios**.
Select a row in the S
Add a new instance to the database.

Saving Your Changes

5. Select **File > Save** to write your changes to the database.



Exercise 8-1. Creating Surfaces and Strat Units

Creating Surfaces in Surface/Fault Data Manager

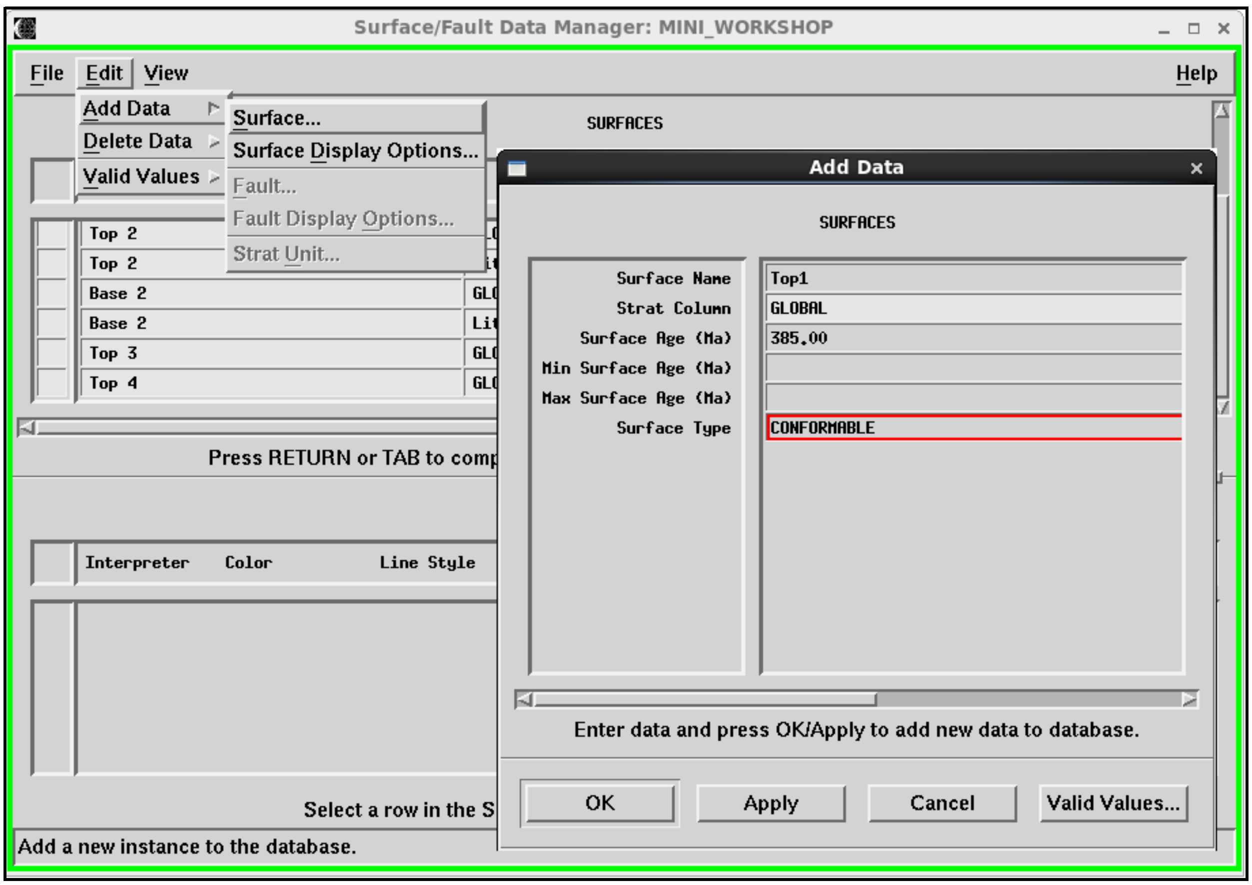
In this exercise, you will use the Surface/Fault Data Manager to add new surfaces and strat units to your MINI_WORKSHOP project.

1. Change your OpenWorks project to **MINI_WORKSHOP** and set an **interpretation ID**.

2. From the OpenWorks Command Menu, select **Data** > **Management** > **Surface/Fault Data Manager**.

   When the dialog box displays, ensure that SURFACES is the current view, or select **View** > **Surfaces** to make it so.

3. Select **Edit** > **Add Data** > **Surface** to begin adding surfaces.



4. Create the following new surfaces. Select from **Valid Values** where the option is available, such as for Surface Type.

Surface Name	Surface Age	Surface Type
Top 1	385	Conformable
Top 2	395	Conformable
Top 3	415	Conformable
Top 4	430	Conformable
Base 2	415	Conformable

> **Note:**
>
> If a surface name already exists, create the surface using a different name.

5. Click **Apply** or **OK** when you are finished defining each surface.

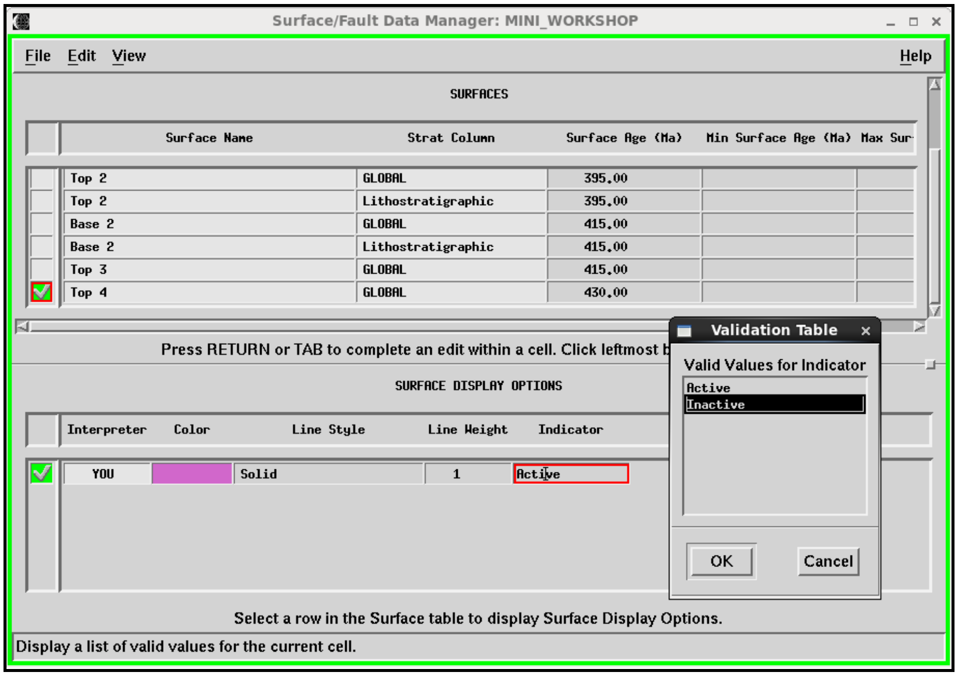
6. Close the **Add Data** dialog box.

7. Select **each surface** by clicking the left-most box in each row to display a check mark.

   The default display options are the same for each surface.

8. Change the **Display Options** so that they are different from each other by making each a different **Color**.

9. Change the Indicator for **Top 4** from **Active** to **Inactive**.



10. Select **File** > **Save**.

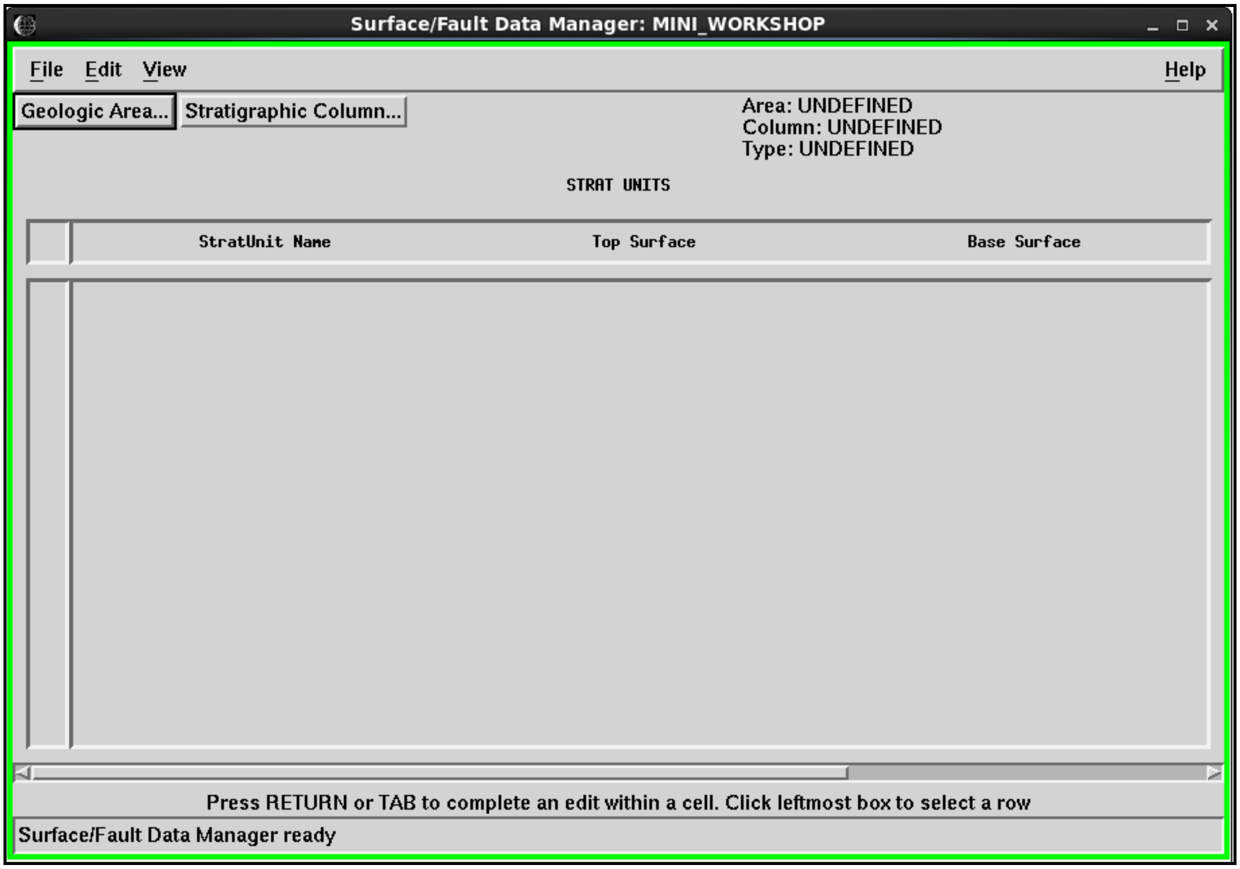
Creating Strat Units in Surface/Fault Data Manager

You can add and edit stratigraphic units when at least two surfaces exist in the database. A strat unit is defined by four parameters:

- Top/bottom boundaries – must be defined surfaces
- Parent unit to which it belongs (optional)
- Rock type of the unit
- Stratigraphic unit to which it belongs

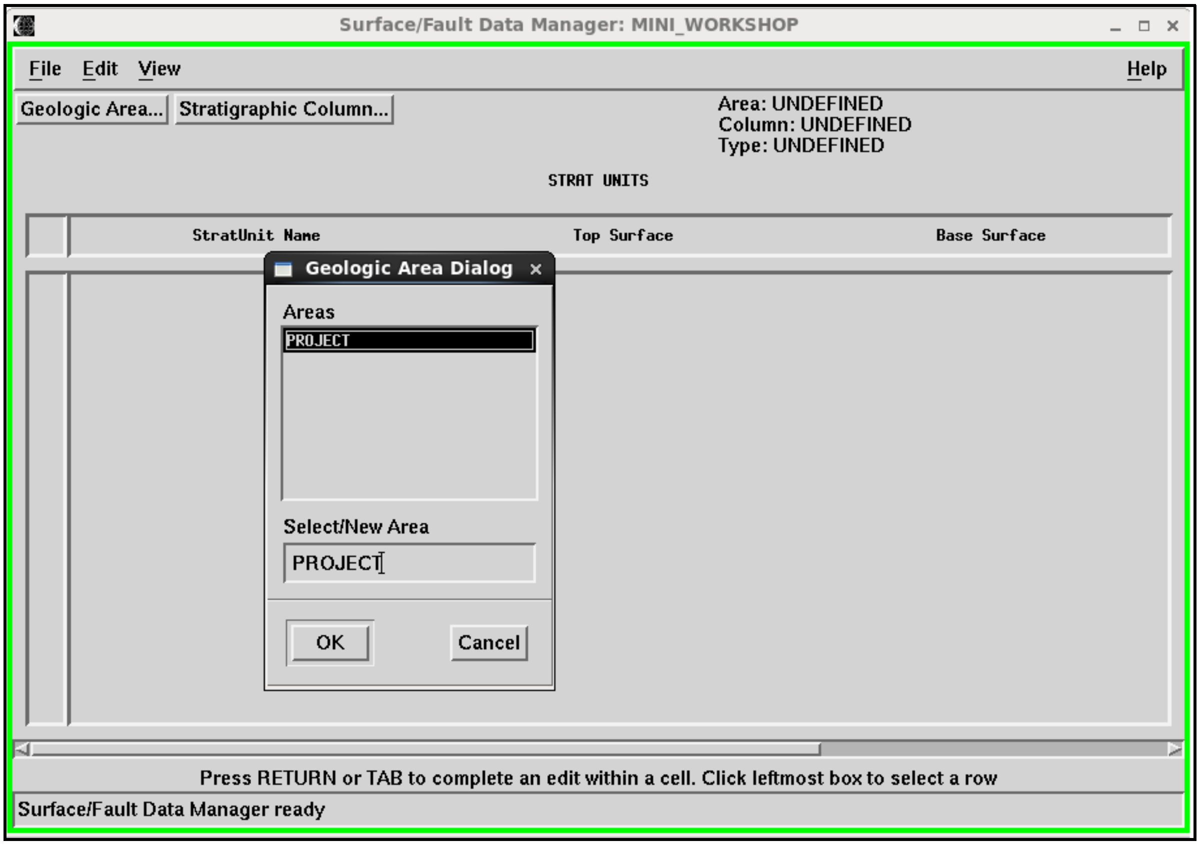
To create a strat column follow these steps.

1. Select **View > Strat Units.** An empty Surface/Fault Data Manager dialog box appears.



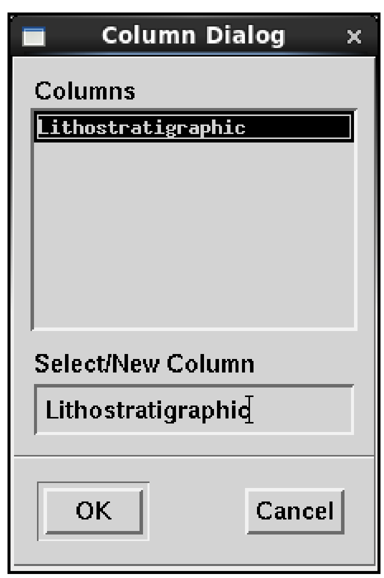
Notice the parameters for Area, Column, and Type are undefined. These must be specified before you can view your strat unit.

2. Click **Geologic Area** to display the Geologic Area dialog box.

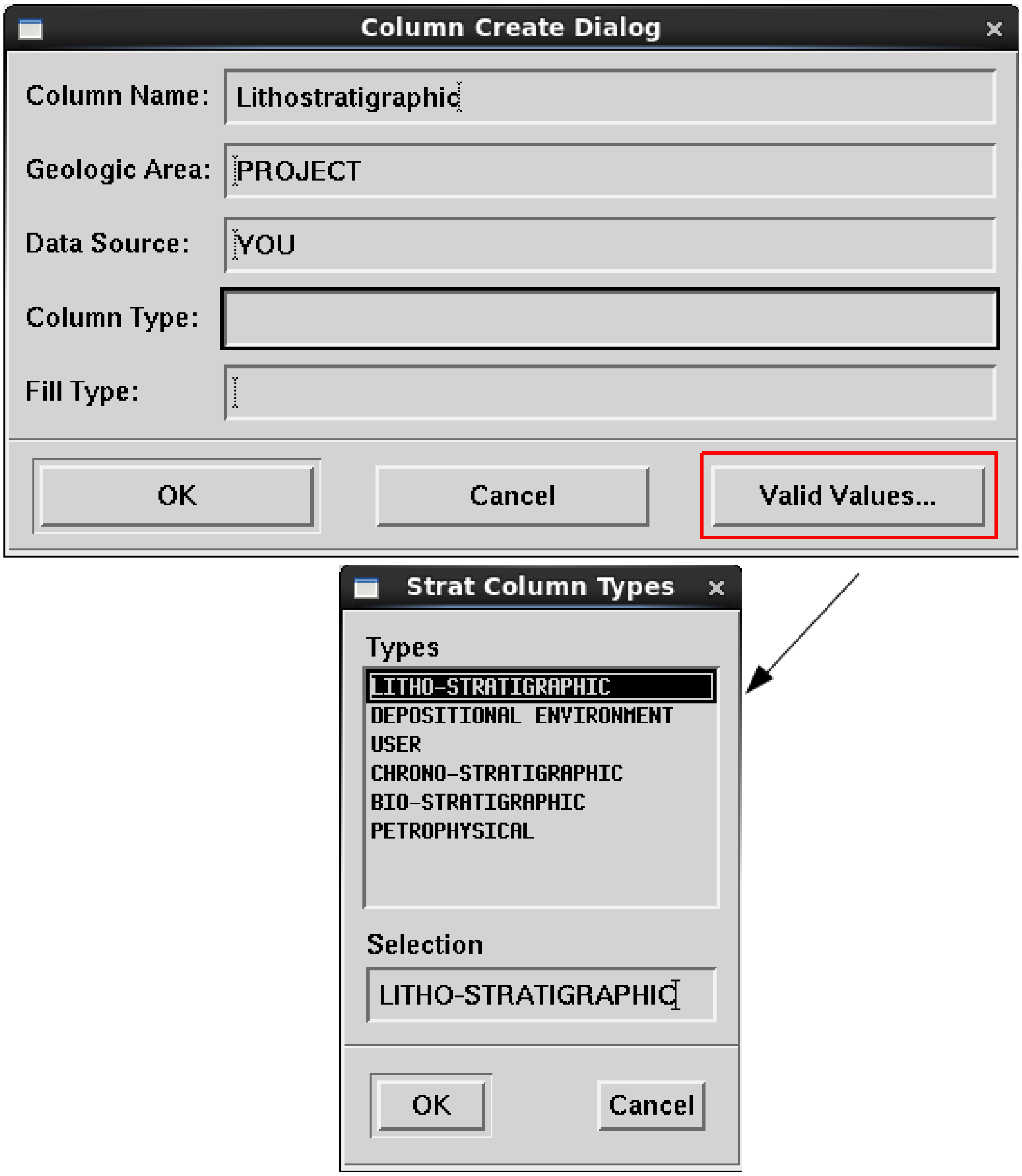


3. Select **PROJECT** and click **OK.**

4. From the main window, click **StratigraphicColumn**. In the Column dialog box, select or enter the new column name, **Lithostratigraphic**, and click **OK**.

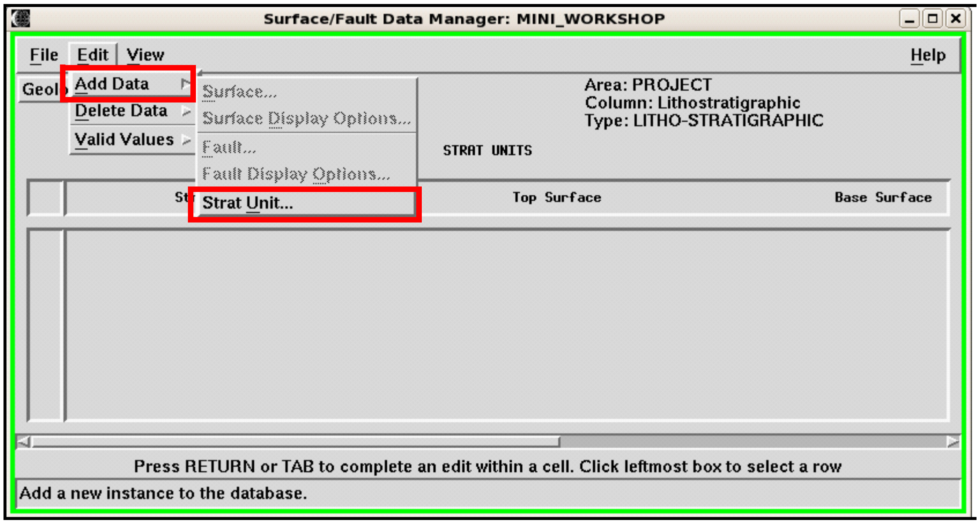


5. When you create a new column name, the *Column Create* dialog box appears. To specify the column type, place the cursor in the **Column Type** field and then click the **Valid Values** button**.** The *Strat Column Types* dialog box appears. Select **LITHO-STRATIGRAPHIC** from the **Types** list and click the **OK** button. Then, click the **OK** button in the *Column Create* dialog box.



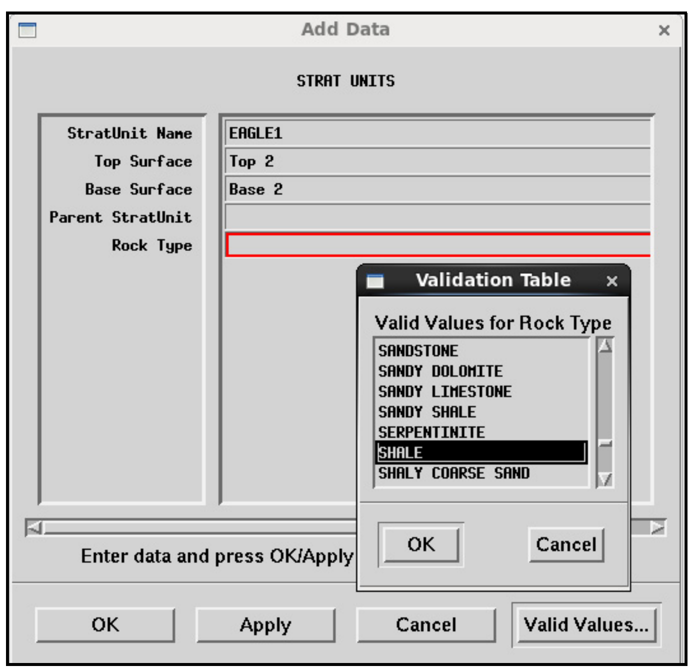
To define a strat unit for the selected column Lithostratigraphic, follow these steps:

1. Select **Edit > Add Data > Strat Unit**.



2. In the Add Data dialog box, define the following parameters:

   - **StratUnit Name**: Enter **EAGLE1**
   - **Top Surface**: Select **Top2** using **Valid Values**
   - **Base Surface**: Select **Base 2** using **Valid Values**
   - **Parent Unit:** (optional)
   - **Rock Type**: Select **SHALE** using **Valid Values**



3. Click **OK** to save the strat unit to the database.

Viewing the Surfaces in WOW Software

To see the surfaces you created in WOW software, complete the following steps:

1. Enter **`http://<your machine name here>/`** in the address line of your browser.

2. Click **OpenWorks** in the left pane of the WOW software main window.

3. Click **MINI_WORKSHOP** in the middle pane of the WOW software main window.

4. Click **1** next to **Strat Columns** in the **Admin** section.

5. Click the **arrow** in the **View** column.

Chapter 9
Exporting Data

Five OpenWorks software utilities allow you to export data from the OpenWorks software, and to move data from one OpenWorks project to another.

- **Well Import / Well Export (Classic)** allows you to import and export well and curve data either through a Landmark-provided format or through a custom format.

- **Well Data Manager** allows you to export tabular data in several ASCII formats, pdf, or excel files without the need to create a format.

- **Data Import** and **Data Export** allow you to import and export map data such as point sets, grids, and fault polygons.

- **Project Data Transfer (PDT)** allows you to move data from one OpenWorks project to another.

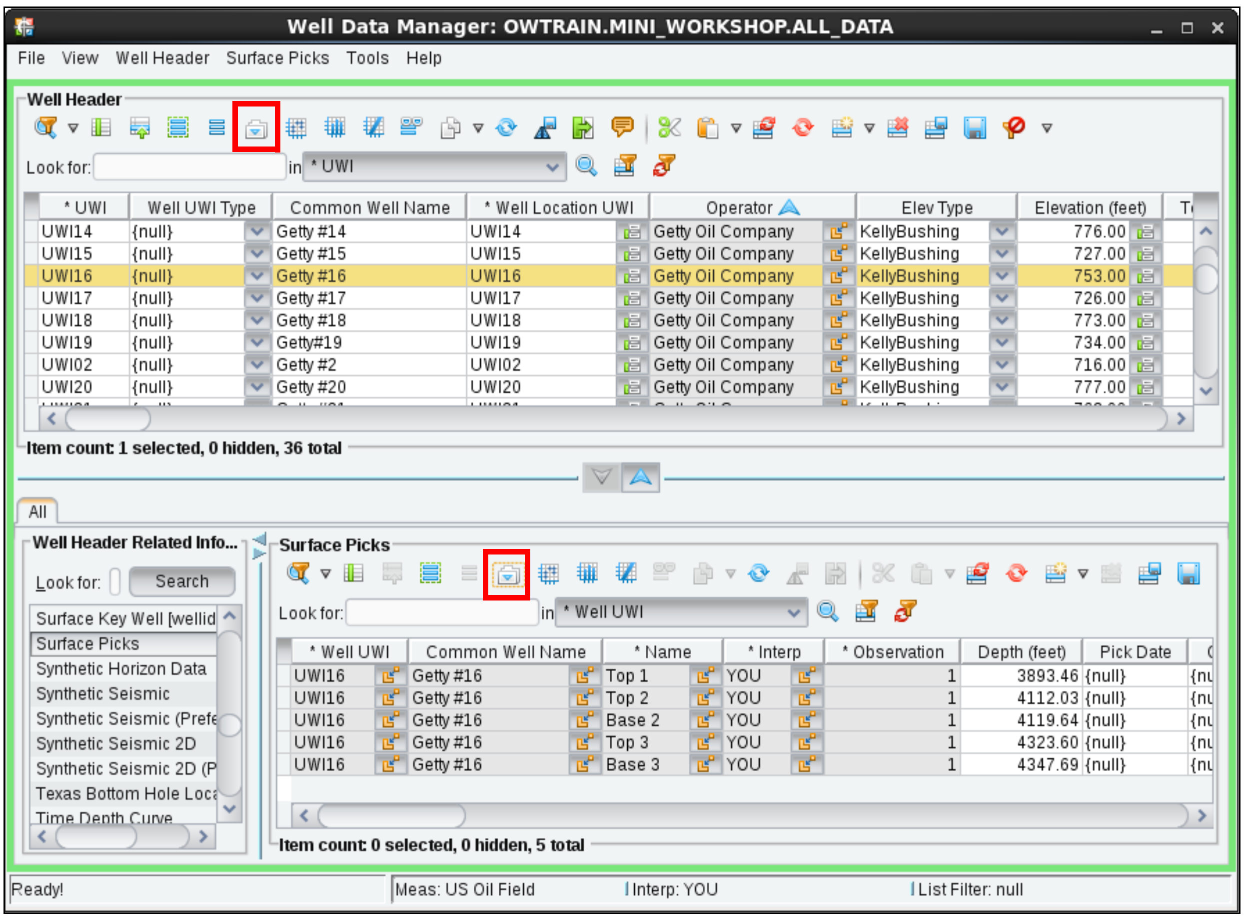
Chapter Objectives

In this chapter you will:

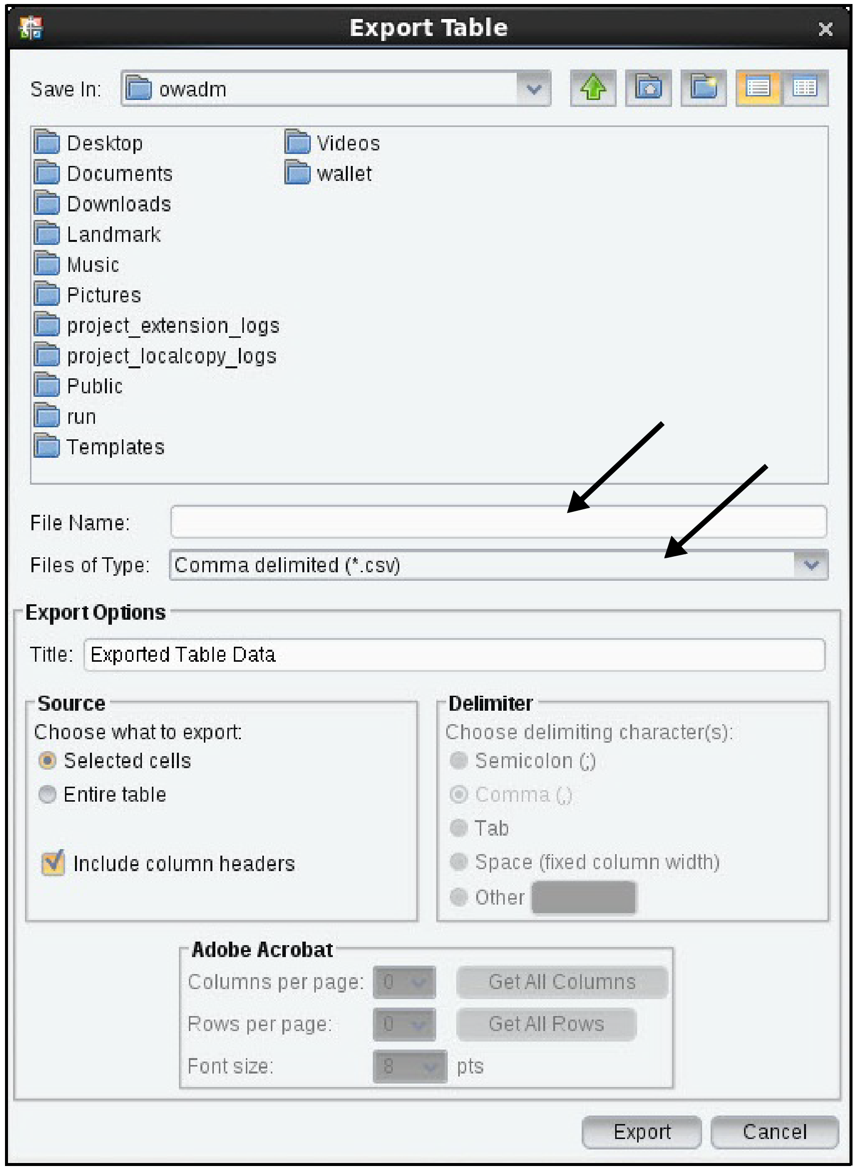
- Learn how to export data easily from Well Data Manager.
- Learn to export well data using predefined formats.
- Use Landmark formats to export well header, pick, position log, and curve data.
- Learn how to import and export point set data.
- Learn how to view, edit, or delete point set data.
- Learn how to create an embedded database.
- Learn how to create and view wells in a local project.
- Learn how to transfer data from local to a regional project using Project Data Transfer (PDT).

Using Well Data Manager to Export Well Data

Well Data Manager is the window to the database, and you can also export data you are looking at directly from Well Data Manager, by clicking on an **Export** icon. You can export any well data information that is displayed on the screen. This icon may be executed from the upper pane or from the lower pane. In the example image, if you click on the upper pane export button you will export well header information and if you click on the lower pane export button you will export pick information.

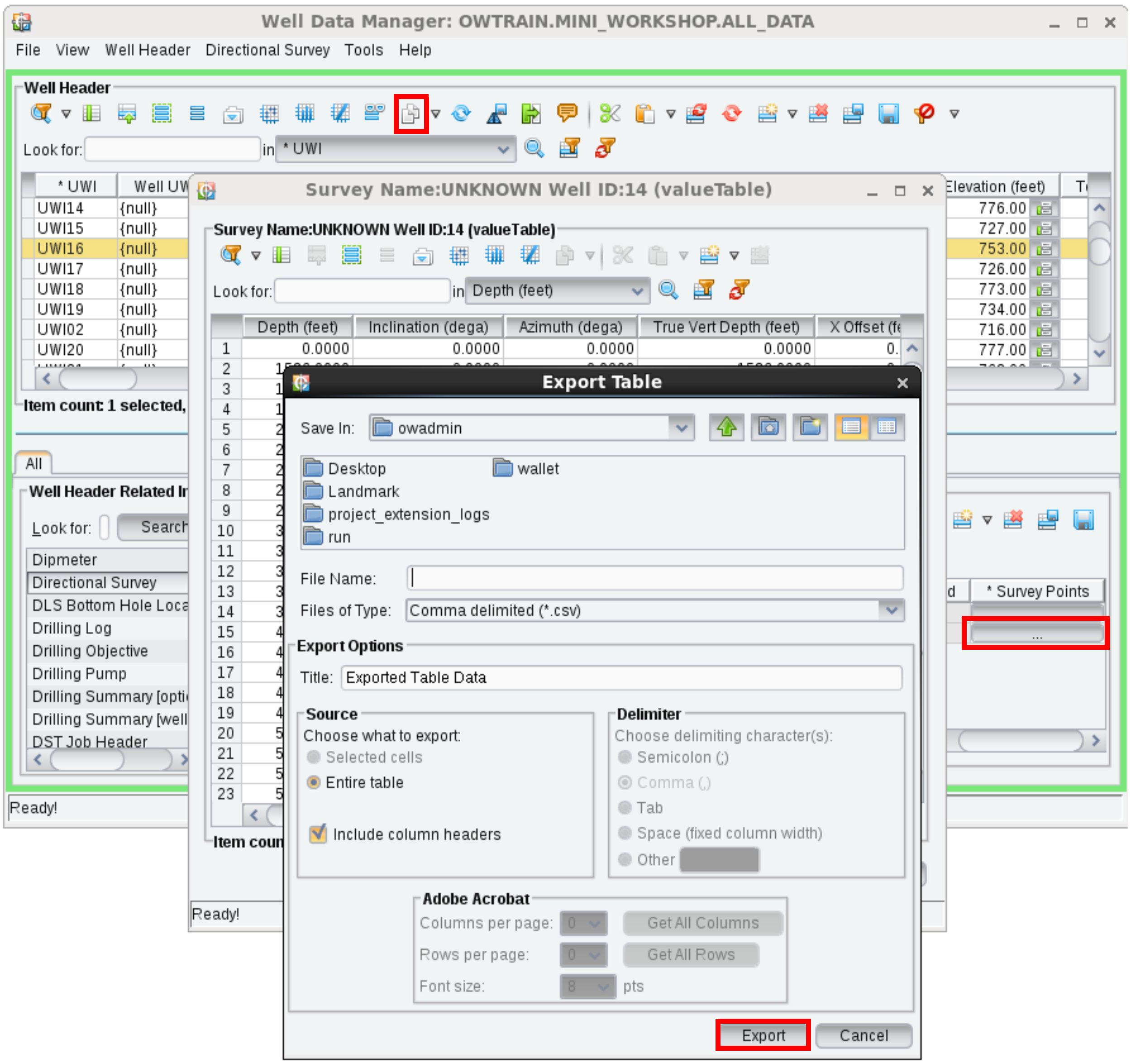


After clicking the button, an export window will open, then you should select the name and format for your export file.



If you want to change the way the data is exported in the file, change the display format first, and then export the data.

When you are displaying curve information (directional surveys, time depth tables, log curves, etc.) the data displayed in the lower panel is the header of the curve. If you want to see the actual values of the curve instance, you will have to scroll right and look for log values fields, click the ellipsis (...) button.

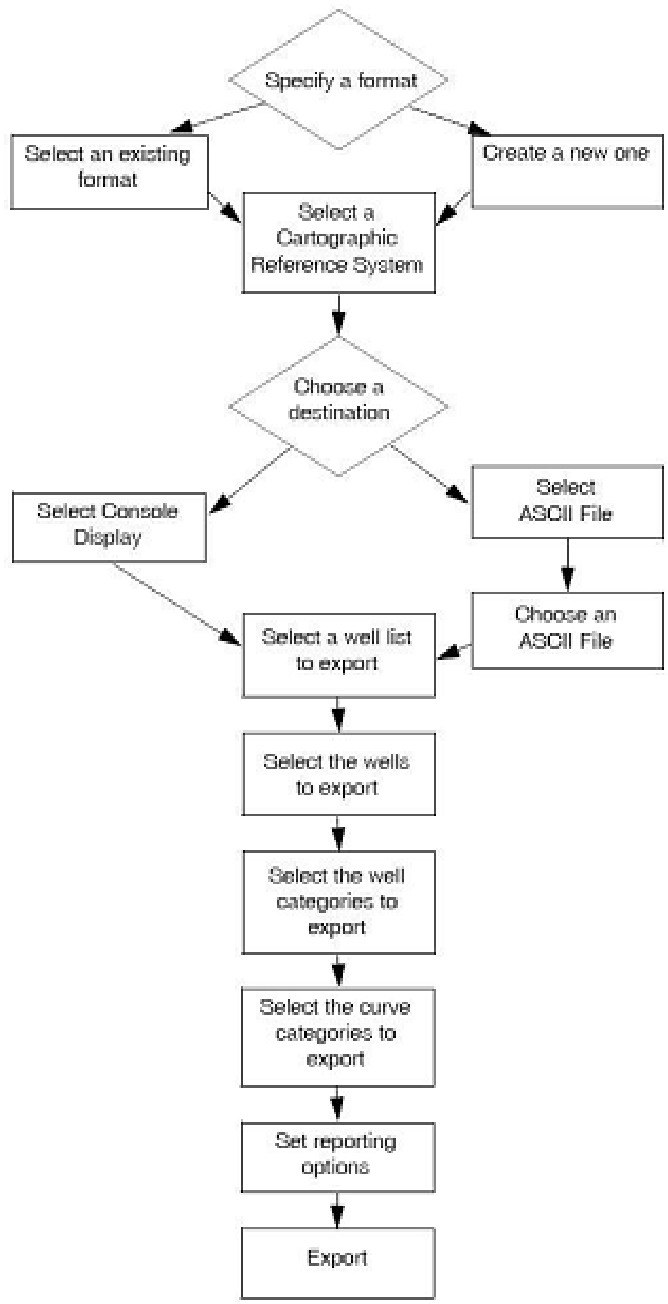


Then you can export log values to an ASCII file.

Using Well Data Export Options to Export Well Data

To export data from the database in an specific format, use well data export.

Workflow for Exporting Well Data



Units Handling in Well Data Export

By default, Well Data Export uses the current session measurement system, but you should export using the most accurate measurement system for your data, and this could be something different.

Well Data Export uses the units of measure defined by the selected export measurement system for all exported values except well depth units and well distance (that is, *x-y* location) units. When you export to LAS, LIS, and DLIS formatted files, you can specify the unit of measure for individual export mnemonics.

When you export, Well Data Export converts units from their stored values for all data types except those that were originally "exceptions to conversion." These include the following:

Data Category	**Data Item**	**Description**
Casing	Cement Amt	The amount of cement used to set the casing in place.
Core Property Analysis	property1, FK property2 property3 property4 interp result value	The unique abbreviated name of the first core property (e.g., sand, shale, porosity).
DST RFT Summary	Bot Hole Temp Gas Oil Ratio Estimated Damage Ratio Slope Line Shape	The recorded bottom home temperature for a drill stem or repeat formation test.The gas/oil ration of the fluid recovered from a drill stem test.The estimated damage ration calculated from a drill stem test. The shape of the slope line on the sheet of the recorder during a drill stem test.
Liner	Cement Amt	the amount of cement pumped during the installation of this liner
Mud Report	Gel Strn 10 min Gel Strn 10 sec	The gel strength after 10 minutes The gel strength after 10 seconds
Production Flow Measurement (legacy)	Flow Rate Prod Volume	The measured flow rate. The measured fluid volume.
Production Volume Disposition (legacy)	Volume Quality	The numeric measure of volume quality or heat content.

Data Category	Data Item	Description
Plugging	Cement Amt Plugging	The amount of cement used to plug a wellbore.
Squeeze Info	Squeeze Amt	The amount of slurry plumped to perform the squeeze job.
Well Core Description	Dip Angle	The angle of inclination of bedding planes measured in a core.
Well Core Sample Analysis	Cation Exchange Cap Resistivity Index Skin Factor	The measured cation exchange capacity. The computed resistivity index. The sample skin factor.
Well Core Sample Description	Dip Angle	The angle of inclination of bedding planes measured in the core.
Well Perforation	Perforation Angle	For directional perforating, the angle of perforations expressed in degrees relative to north.
Well Sieve Screen	Screen Size	The size of screen in the sieve.
Well Test Analysis	Condensate Ratio Gor Gwr Lgr Wor	The condensate gas ratio. The value for the gas oil ratio. The gas water ratio. The liquid gas ratio. The water oil ratio.
Well Test Computed Analysis	Confidence Limit Est Damage Ratio Slope Si	The final extrapolated confidence limit, in PSIG, indicates the degree of confidence associated with the extrapolated reservoir pressure. The estimated damage ratio. The slope of the linear portion of the pressure build-up curve.

Exporting Data with a Predefined Format

Landmark provides the following predefined formats for exporting data.

These formats are stored in the *$OWHOME/dat/wlx* directory. If one of these formats is suitable for your purposes, it only takes a few steps to select it and export your data. If not, you can select a format that is close to what you want and edit it, or you can create your own new format.

Landmark provides a number of format files. The format files for Well Data Exporter have a *.bcl* suffix for binary formats or a *.wlx* suffix for ASCII formats.

The table below outlines binary format files.

Format File	Description
BakerAtlas.bcl	Attempts to include most common mnemonics used by Baker Atlas. Check the file and update it for your purposes.
Example.bcl	A basic template that includes common abbreviations for well information mnemonics, basic petrophysical parameters, and some equipment and tool codes all mapped to the correct OpenWorks tables.
Halliburton.bcl	Attempts to include most common mnemonics used by Halliburton. Check the file and update it for your purposes.
LGC.bcl	Attempts to closely match export and import formats to the OpenWorks scheme.
Schlumberger.bcl	Attempts to include most common mnemonics used by Schlumberger. Check the file and update it for your purposes.

The table below outlines ASCII format files.

Format File	Description
LGCReportFmt.wlx	Exports data in the standard report format for OW 4.0.
LGCScout.wlx	Exports scout tickets with well, elevation, log header, and pick info.
owxAll.wlx	The most comprehensive predefined format for exporting data from the OpenWorks software. Does not export curve or production data.
owxDirSurv.wlx	A format that exports directional survey data.
owxFaults.wlx	Exports well bore fault cuts.
owxLog.wlx	Exports multi-well/multi-log for import to new Open-Works project. Uses format flags defined for import.
Example.wlx	Example format file
owxPointSet.wlx	Exports point set data for Map Data I/O.
owxPosLog.wlx	Exports position log data.
owxSyn.wlx	Exports synthetics.
owxTimeDepth.wlx	Exports time-depth tables.
owxWellsTops.wlx	Exports well header and top information.

Examples of Predefined Formats

This section provides a sample of four common export formats.

Halliburton.bcl

```
Terminal
File  Edit  View  Search  Terminal  Help
dsd7{owadmin}% more Halliburton.bcl
COMP    0       0       Operator        Well Header
COUN    0       0       County  Well Header
PROV    0       0       State   Well Header
FLD     0       0       Field   Well Header
JOBA    0       0       Acquisition Job No      Logging Job
ENGI    0       0       Logger Name     Logging Job
WITN    0       0       Witness Name    Logging Job
DFT     0       0       Mud Type        Logging Mud Test
MFSS    0       0       Log Rmf Source  Logging Mud Test
MSS     0       0       Sample Source   Logging Mud Test
RUNA    0       0       Acquisition Run No      Logging Tool String Descent
DATE    0       0       Log Run Date    Logging Tool String Descent
TITLE1  0       0       Remark  Logging Tool String Descent
TLI     0       0       Top Depth       Logging Tool Pass
BLI     0       0       Base Depth      Logging Tool Pass
BS      0       0       Hole Diameter   Logging Job
CBL     0       0       Casing Shoe Depth       Logging Job
DFD     0       0       Mud Weight      Logging Mud Test
DFL     0       0       Water Loss      Logging Mud Test
DFPH    0       0       Ph Value        Logging Mud Test
DFV     0       0       Mud Viscosity   Logging Mud Test
EKB     0       0       Elevation       Well Header
MFST    0       0       Log Rmf Temp    Logging Mud Test
MRT     0       0       Max Rec Temp    Logging Tool String Descent
MST     0       0       Log Rm Temp     Logging Mud Test
RMB     0       0       Log Rm At Bht   Logging Mud Test
RMFS    0       0       Log Rmf Logging Mud Test
RMS     0       0       Log Rm  Logging Mud Test
RW      0       0       Log Rw  Logging Mud Test
RWT     0       0       Log Rw Temp     Logging Mud Test
TDL     0       0       Total Depth     Well Header
BHT     0       0               Petrophysical Parm Value        BottomHoleTemperature
BS      0       0               Petrophysical Parm Value        BitSize
MCST    0       0               Petrophysical Parm Value        ResMudcakeTemp
MFST    0       0               Petrophysical Parm Value        ResMudFiltrateTemp
MST     0       0               Petrophysical Parm Value        ResMudTemp
RMCS    0       0               Petrophysical Parm Value        ResMudcake
RMFS    0       0               Petrophysical Parm Value        ResMudFiltrate
RMS     0       0               Petrophysical Parm Value        ResMud
DFD     0       0               Petrophysical Parm Value        WeightMud
A       0       0               Petrophysical Parm Value        TortuosityFactor
M       0       0               Petrophysical Parm Value        CementationExponent
TD      0       0               Petrophysical Parm Value        BottomHoleDepth
BHT     0       0               Petrophysical Parm Value        BottomHoleTemperature
--More--(81%)
```

BakerAtlas.bcl

```
Terminal
File  Edit  View  Search  Terminal  Help
dsd7{owadmin}% more BakerAtlas.bcl
RUN-NUMBER      0       0       Acquisition Run No      Logging Tool String Descent
WELL-NAME       0       0       Well Name       Well Header
CBLO    0       0       Casing Shoe Depth       Logging Job
OPER    0       0       Operator        Well Header
JOBA    0       0       Acquisition Job No      Logging Job
WITN    0       0       Witness Name    Logging Job
ENGI    0       0       Logger Name     Logging Job
RUNA    0       0       Acquisition Run No      Logging Tool String Descent
DATE    0       0       Log Run Date    Logging Tool String Descent
NATI    0       0       Country Well Header
STAT    0       0       State   Well Header
COUN    0       0       County  Well Header
FN      0       0       Field   Well Header
WN      0       0       Common Well Name        Well Header
CN      0       0       Operator        Well Header
DTM     0       0               Petrophysical Parm Value        TransitTimeMatrix
DTF     0       0               Petrophysical Parm Value        TransitTimeFluid
RMS     0       0               Petrophysical Parm Value        ResMud
MST     0       0               Petrophysical Parm Value        ResMudTemp
MCST    0       0               Petrophysical Parm Value        ResMudcakeTemp
RMCS    0       0               Petrophysical Parm Value        ResMudcake
MFST    0       0               Petrophysical Parm Value        ResMudFiltrateTemp
RMFS    0       0               Petrophysical Parm Value        ResMudFiltrate
BSAL    0       0               Petrophysical Parm Value        SalinityBorehole
WSAL    0       0               Petrophysical Parm Value        SalinityWater
DFD     0       0               Petrophysical Parm Value        WeightMud
MW      0       0               Petrophysical Parm Value        WeightMud
A       0       0               Petrophysical Parm Value        TortuosityFactor
M       0       0               Petrophysical Parm Value        CementationExponent
TD      0       0               Petrophysical Parm Value        BottomHoleDepth
SHT     0       0               Petrophysical Parm Value        SurfaceHoleTemperature
BHT     0       0               Petrophysical Parm Value        BottomHoleTemperature
BS      0       0               Petrophysical Parm Value        BitSize
OHDA    0       0               Petrophysical Parm Value        DiameterBorehole
PCWE    0       0               Petrophysical Parm Value        WeightCement
CSIZ    0       0               Petrophysical Parm Value        DiameterCasing
CSDE    0       0               Petrophysical Parm Value        DensityCasing
THNO    0       0               Petrophysical Parm Value        ThicknessCasing
CWEI    0       0               Petrophysical Parm Value        WeightCasing
TDI     0       0               Petrophysical Parm Value        DiameterTubing
CDEN    0       0               Petrophysical Parm Value        WeightCasing
#DOALL  0       0               Logging Tool Config
dsd7{owadmin}%
```

owxAll.wlx (incomplete)

```
Terminal
File  Edit  View  Search  Terminal  Help
dsd7{owadmin}% more owxAll.wlx
5.000000
Format1= FMT 1,1,20,1,0,0,0,0,0;
WellHeader_Uwi=,7,32,1,0,0,1,1,0,1,4,WELL;
WellHeader_WellUwiType=,137,147,1,0,0,0,1,0;
WellHeader_CommonWellName=,34,113,1,0,0,0,1,0;
WellHeader_WellOperator=,7,46,1,0,0,1,2,0,1,5,2WELL;
WellHeader_WellName=,48,87,1,0,0,0,2,0;
WellHeader_WellNumber=,89,98,1,0,0,0,2,0;
WellHeader_XCoordinate=,7,21,1,0,0,1,3,2,1,5,3WELL;
WellHeader_YCoordinate=,23,37,1,0,0,0,3,2;
WellHeader_Latitude=,39,53,1,0,0,0,3,2;
WellHeader_Longitude=,55,69,1,0,0,0,3,2;
WellHeader_XCoordBh=,71,82,1,0,0,0,3,2;
WellHeader_YCoordBh=,84,95,1,0,0,0,3,2;
WellHeader_LatitudeBh=,97,108,1,0,0,0,3,2;
WellHeader_LongitudeBh=,110,122,1,0,0,0,3,2;
WellHeader_OrigXLon=,124,135,1,0,0,0,3,1;
WellHeader_OrigYLat=,137,148,1,0,0,0,3,1;
WellHeader_OrigBhXLon=,150,161,1,0,0,0,3,1;
WellHeader_OrigBhYLat=,163,174,1,0,0,0,3,1;
WellHeader_OrigCrsId=,7,29,1,0,0,1,10,1,1,5,AWELL;
WellHeader_OrigBhCrsId=,30,53,1,0,0,0,10,1;
WellHeader_ElevType=,7,8,1,0,0,1,4,0,1,5,4WELL;
WellHeader_Elevation=,10,21,1,0,0,0,4,0;
WellHeader_TotalDepth=,23,34,1,0,0,0,4,2;
WellHeader_PluggedBackTd=,36,47,1,0,0,0,4,2;
WellHeader_Field=,48,87,1,0,0,1,8,0,1,5,8WELL;
WellHeader_Basin=,89,148,1,0,0,0,8,0;
WellHeader_County=,7,31,1,0,0,1,5,0,1,5,5WELL;
WellHeader_State=,33,53,1,0,0,0,5,0;
WellHeader_Country=,55,79,1,0,0,0,5,0;
WellHeader_InitialClass=,7,46,1,0,0,1,7,0,1,5,7WELL;
WellHeader_InitialStatus=,48,87,1,0,0,0,7,0;
WellHeader_CurrentClass=,89,128,1,0,0,0,7,0;
WellHeader_CurrentStatus=,130,170,1,0,0,0,7,0;
WellHeader_CurrentStatusDate=,172,192,1,0,0,0,7,0;
WellHeader_Symbol=,102,105,1,0,0,0,2,0;
WellHeader_DataSource=,115,119,1,0,0,0,1,0;
WellHeader_PlatformId=,7,26,1,0,0,1,6,2,1,5,6WELL;
WellHeader_PlatformSlotNo=,28,39,1,0,0,0,6,2;
WellHeader_OnOffShore=,41,43,1,0,0,0,6,2;
--More--(3%)
```

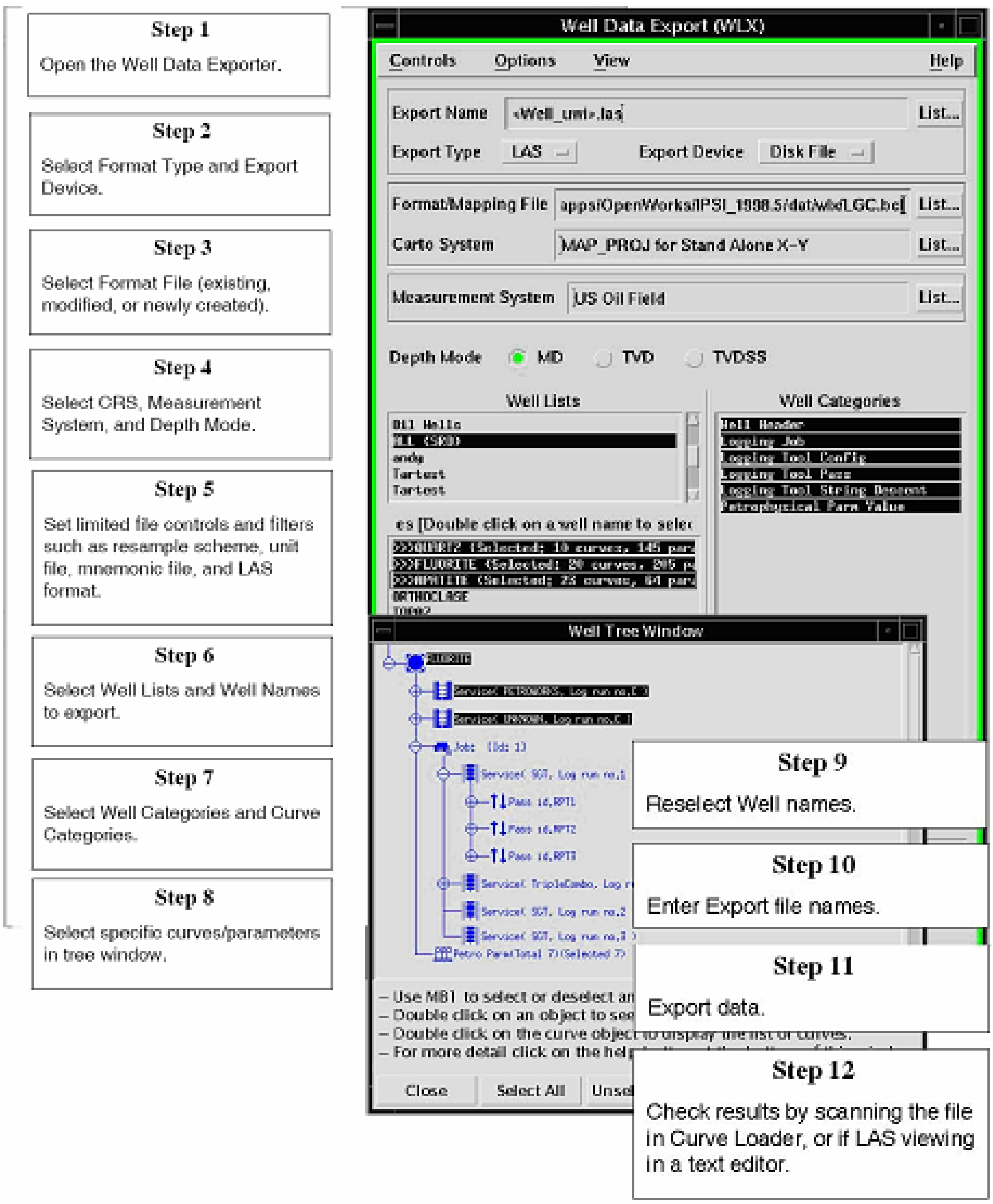
owxDirSurv.wlx

```
dsd7{owadmin}% more owxDirSurv.wlx*
5.000000
Format1= FMT 1,1,20,1,0,0,0,0,0;
Options_Label String=,1,4,1,0,0,0,1,0,DSV1;
DirectionalSurvey_SurveyName=,20,69,1,1,0,0,3,0;
DirectionalSurvey_Company=,16,55,1,0,0,0,4,0;
DirectionalSurvey_SurveyDate=,63,74,1,0,0,0,4,0;
DirectionalSurvey_SurveyMethod=,84,104,1,1,0,0,3,0;
DirectionalSurvey_SurveyConfFact=,74,74,1,1,0,0,1,0;
DirectionalSurvey_NorthReference=,121,132,1,1,0,0,3,0;
DirectionalSurvey_TiePtMd=,18,37,1,1,0,0,7,0;
DirectionalSurvey_TiePtTvd=,45,65,1,0,0,0,7,0;
DirectionalSurvey_TiePtXOffset=,24,38,1,0,0,0,8,0;
DirectionalSurvey_TiePtYOffset=,50,70,1,0,0,0,8,0;
DirectionalSurvey_TiePtInitialAzimuth=,66,86,1,0,0,0,6,0;
DirectionalSurvey_TiePtInitialAngle=,28,47,1,0,0,0,6,0;
DirectionalSurvey_MeasuredDepthOuom=,47,50,1,0,0,0,1,0;
DirectionalSurvey_Depth=,7,18,1,1,0,1,10,1,1,4,DSVA;
DirectionalSurvey_Inclination=,20,31,1,1,0,0,10,1;
DirectionalSurvey_Azimuth=,33,44,1,1,0,0,10,1;
DirectionalSurvey_Remark=,16,95,1,0,0,0,5,0;
WellHeader_Uwi=,12,37,1,0,0,0,1,0;
WellHeader_CommonWellName=,15,94,1,0,0,0,2,0;
Options_Label String. 2=,7,10,1,0,0,0,1,0,UWI:;
Options_Label String. 3=,40,45,1,0,0,0,1,0,Depth:;
Options_Label String. 5=,1,4,1,0,0,0,2,0,DSV2;
Options_Label String. 6=,7,13,1,0,0,0,2,0,Common:;
Options_Label String. 7=,1,4,1,0,0,0,3,0,DSV3;
Options_Label String. 8=,7,18,1,0,0,0,3,0,Survey Name:;
Options_Label String. 10=,1,4,1,0,0,0,4,0,DSV4;
Options_Label String. 11=,7,14,1,0,0,0,4,0,Company:;
Options_Label String. 12=,57,61,1,0,0,0,4,0,Date:;
Options_Label String. 13=,1,4,1,0,0,0,5,0,DSV5;
Options_Label String. 14=,7,14,1,0,0,0,5,0,Remarks:;
Options_Label String. 4=,60,72,1,1,0,0,1,0,Conf. Factor:;
Options_Label String. 19=,108,118,1,1,0,0,3,0,North Ref.:;
Options_Label String. 9=,73,79,1,1,0,0,3,0,Method:;
Options_Label String. 20=,1,4,1,0,0,0,6,0,DSV6;
Options_Label String. 21=,7,27,1,0,0,0,6,0,Tie Pt Initial Angle:;
Options_Label String. 22=,48,64,1,0,0,0,6,0,Initial Azimuth:;
Options_Label String. 23=,1,4,1,1,0,0,7,0,DSV7;
Options_Label String. 24=,7,16,1,0,0,0,7,0,Tie Pt Md:;
Options_Label String. 25=,40,44,1,0,0,0,7,0,Tvd:;
--More--(84%)
```

Procedure for Exporting Data with a Predefined Format Using Well Data Export Tool

The procedure you follow varies, depending on the type of format.

General "Binary" Formatted Data Export Workflow



General ASCII Formatted Data Export Workflow

Step 1

Open the Well Data Exporter.

Step 2

Select Format Type and Export Device.

Step 3

Select Format File (existing, modified, or newly created).

Step 4

Select CRS, Measurement System, and Depth Mode.

Step 5

Set ASCII export file controls and filters such as resample scheme, specific log curve types, zones, and report options.

Step 6

Select Well Lists and Well Names to export.

Step 7

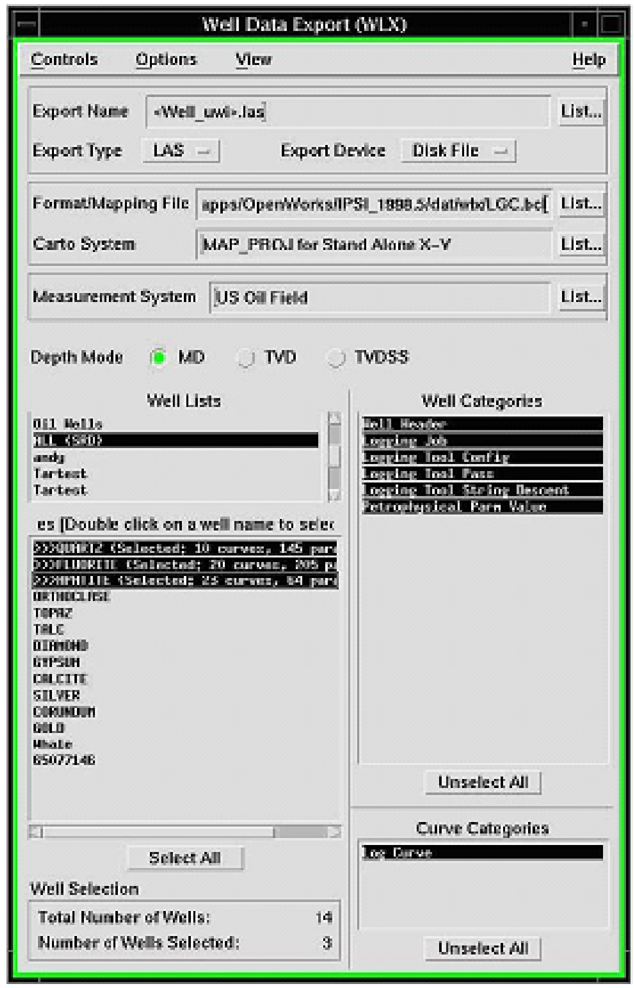
Select Well Categories and Curve Categories.

Step 8

Enter export file name.

Step 9

Export data.



Step 10

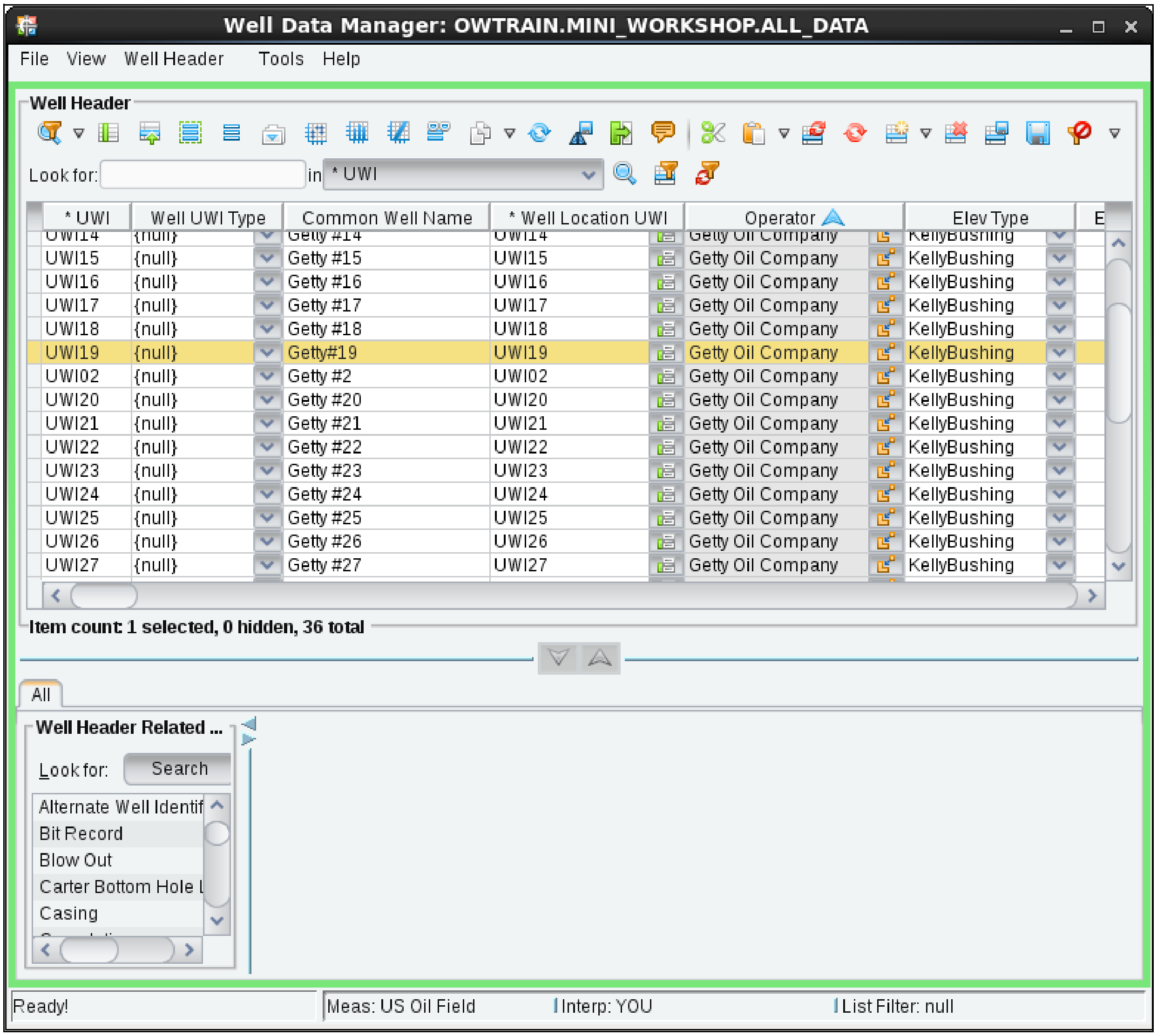
Check results of export report and view ASCII file.

Exercise 9-1: Exporting Data with Well Data Manager

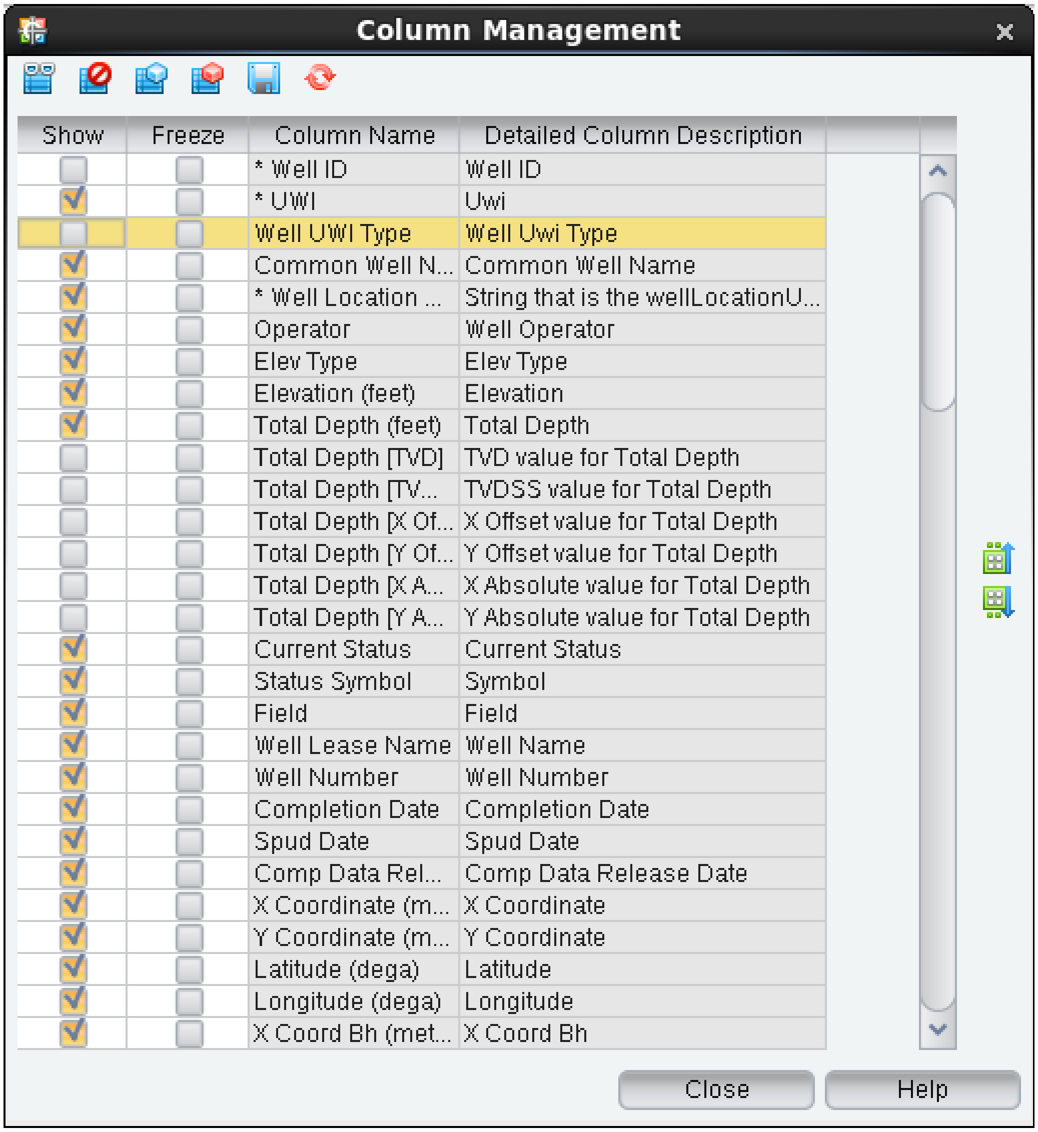
1. Ensure that **MINI_WORKSHOP** is the current project.

2. Open Well Data Manager and select **All Well Header** in the filter window.

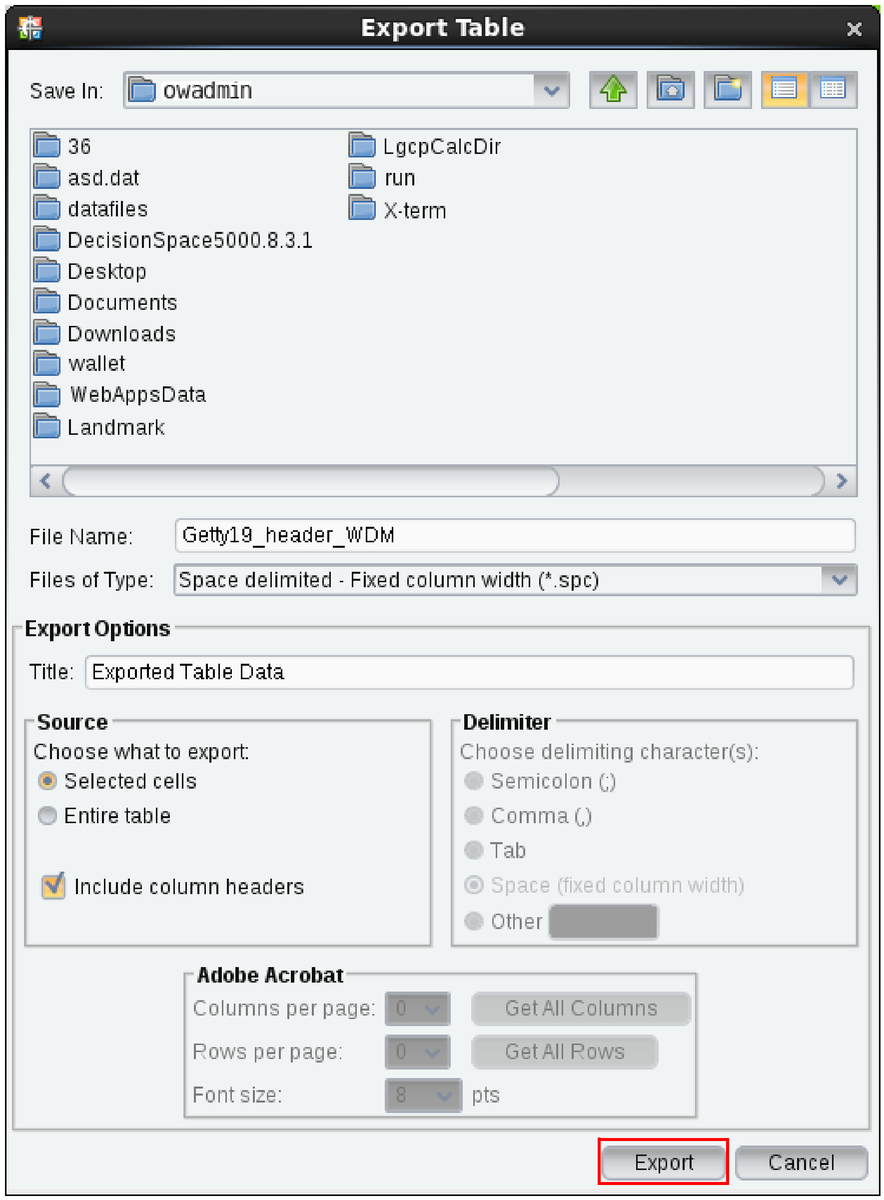
3. When the Well Data Manager window opens, select the **Getty19** well in the upper pane.



4. To remove undesired columns from the view, click the  button and deselect **Well ID** and **Well UWI** type.

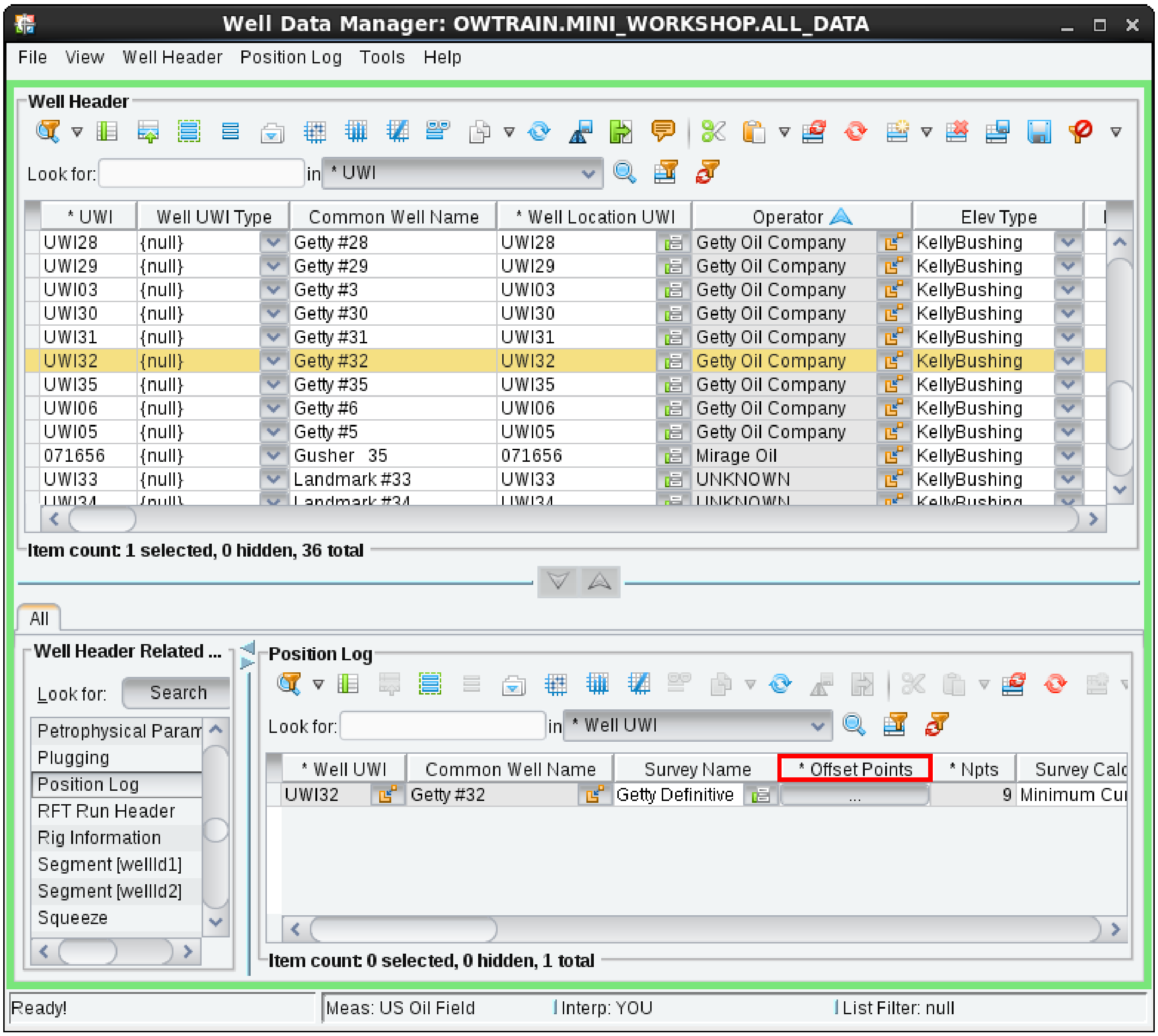


5. Highlight the well header line for well Getty #19. Highlight the whole row to export all the associated header information, or select specific information fields in the row (use Ctrl-MB1 to select). Click the **Export** icon  (the *Export Table* dialog box displays).



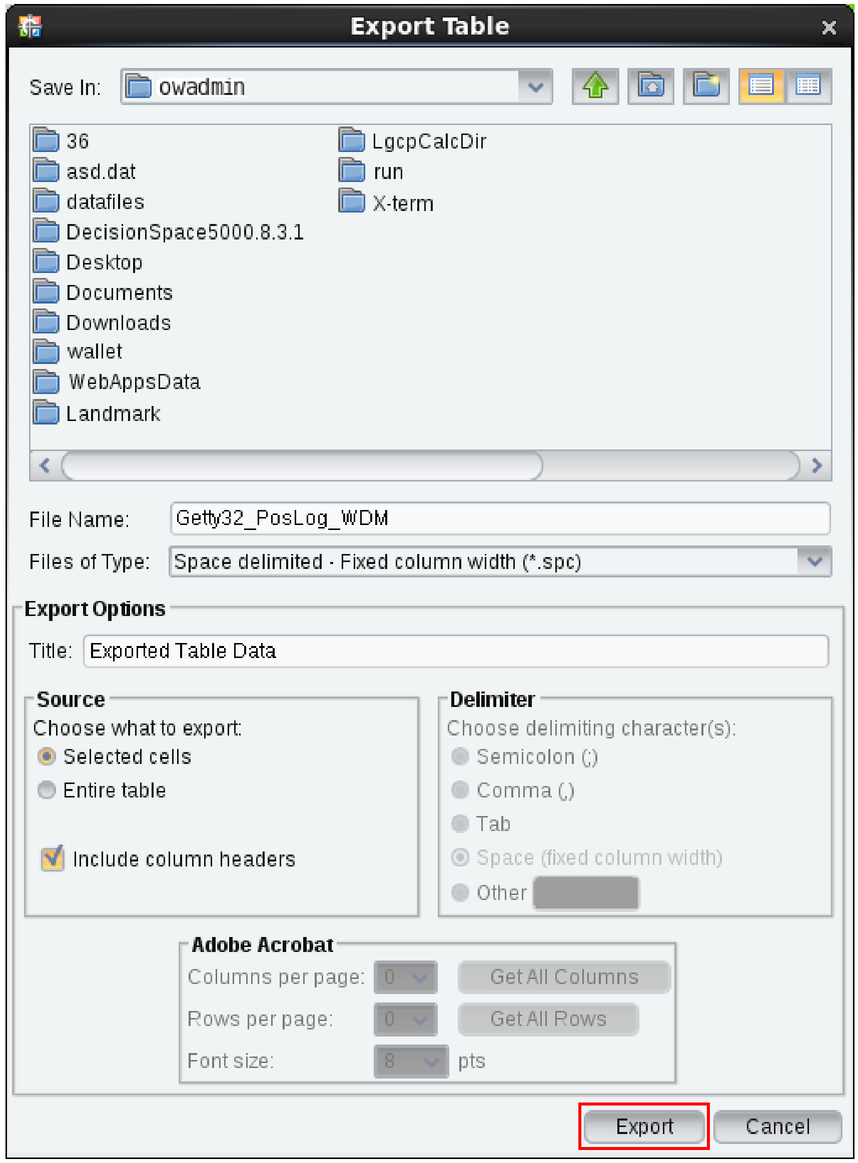
6. Save a space delimited file (*.spc*) with the name **Getty19_header_WDM**. Click the **Export** button.

7. Now, in the upper pane, select the **Getty 32** wells, and on the lower pane, select **Position Log**.

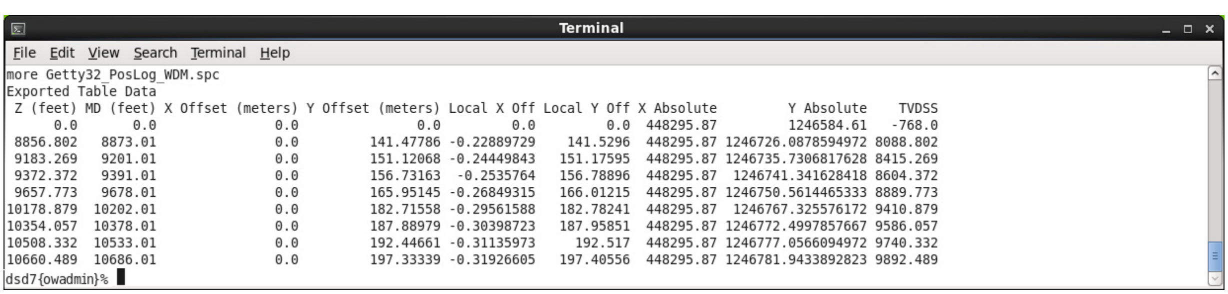


8. Scroll to the right and click the ***Offset points** column.

9. On the value table, click on the export icon and save the file as a space delimited file with the name: **Getty32_PosLog_WDM**. Click the **Export** button.



An example of the exported file is shown here.



Exercise 9-2: Using Predefined Formats

In these exercises, you export a well header, curves, picks, and position logs using four different predefined formats:

- owxAll.wlx
- Halliburton.bcl
- owxWellsTops.wlx
- owxPosLog.wlx

Then you create a new project and import the output into it, again using predefined formats.

Exporting a Well Header with the owxAll Format

In this exercise you use the owxAll.wlx format to output only well header data for a selected well.

1. Ensure that **MINI_WORKSHOP** is the current project.

2. Select **Data > Export > Well Export (Classic)** from the OpenWorks command menu.

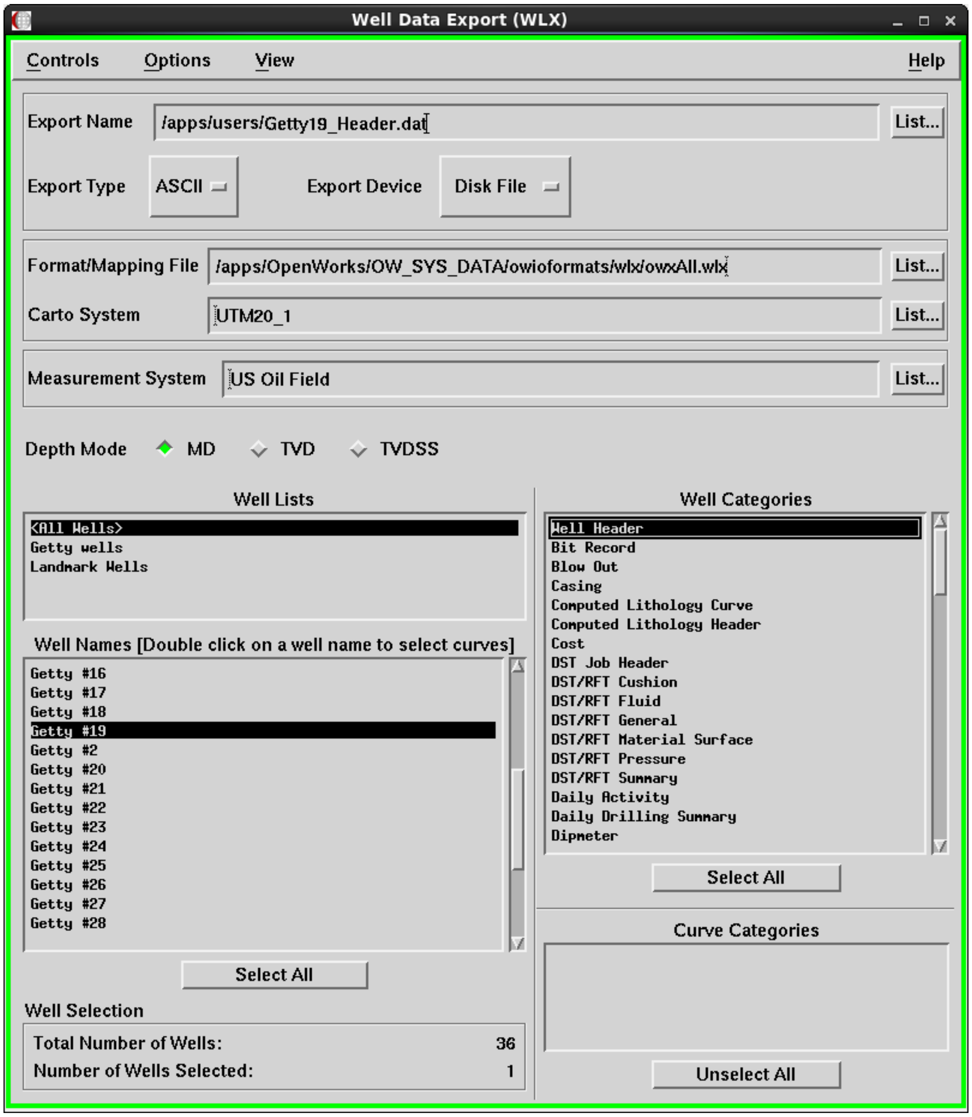
3. Set the **Export Type** to **ASCII**, the Carto System to **UTM20_1**, the **Measurement System** to **US Oil Field**, and the **Depth Mode** to **MD**.

4. Use the **Format/Mapping File List** button to select owxAll.wlx.

5. Set the **Export Device** to **Disk File**, and use the **List** button next to **Export Name** to generate the output to your default directory in a file named **Getty19_Header.dat**.

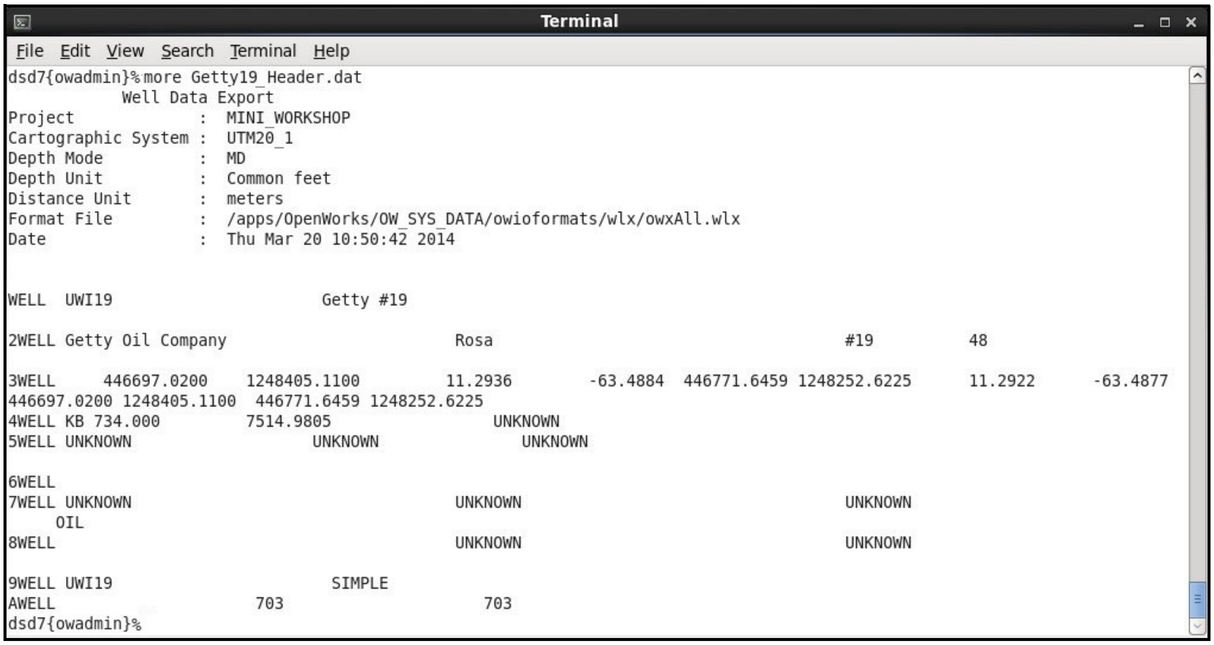
6. Select **All Wells** from **Well Lists**, and well **Getty #19** from the **Well Names** list.

7. Click the **Unselect All** button to turn off all Well Categories, then highlight only **Well Header**.



8. Select **Controls > Export** from the Well Data Export menu bar.

9. Now view your export. From an xterm window, type: **`more Getty19_Header.dat`**.



10. Compare this file with the one you exported from Well Data Manager.

11. Repeat this process to export well header data for **Getty #11**. Name the export file **Getty11_Header.dat**.

Exporting Curve Data with a DLIS Format

In this exercise you use the Halliburton.*bcl* format to output curve data for a selected well.

1. Set the **Export Type** to **DLIS** and the **Export Name** to **Getty19.dlis**.

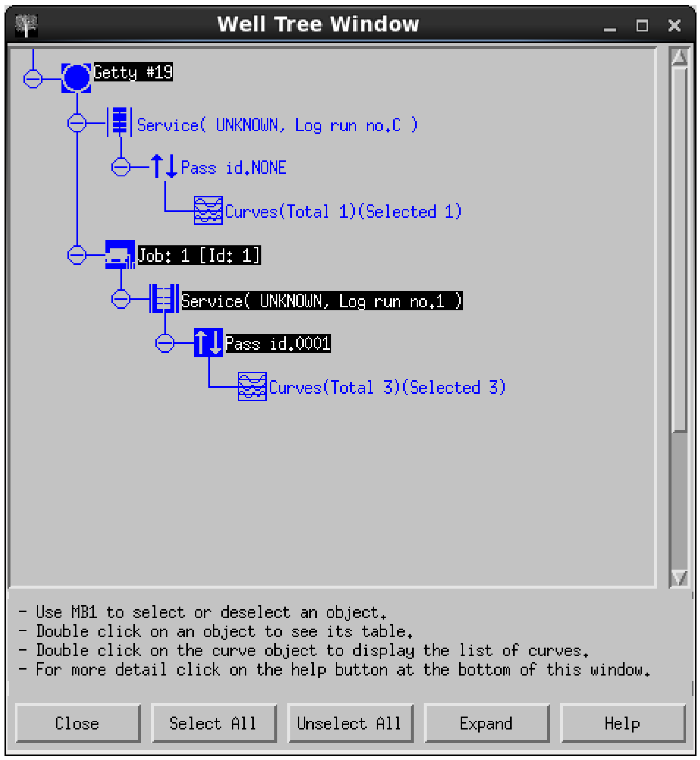
2. Use the **Format/Mapping File List** button to change the selected format file to **Halliburton.bcl**.

3. Make sure that the **Getty #19** well is selected from the **Well Names** list, and that **Well Header** is highlighted under **Well Categories** and **Log Curve** is highlighted under **Curve Categories**. Then double-click the **Getty#19** well. The Well Data Exporter will begin building an Instance Tree. A progress bar shows the progress as the instance tree is being built.

4. Once this process is finished, you will see the Well Tree Window. Review the Instance Tree and expand the Job number, Service, and Pass ID branches of the well by clicking the + symbol.

5. Highlight the **Job number**, **Service**, and **Pass ID** as shown in the next illustration.

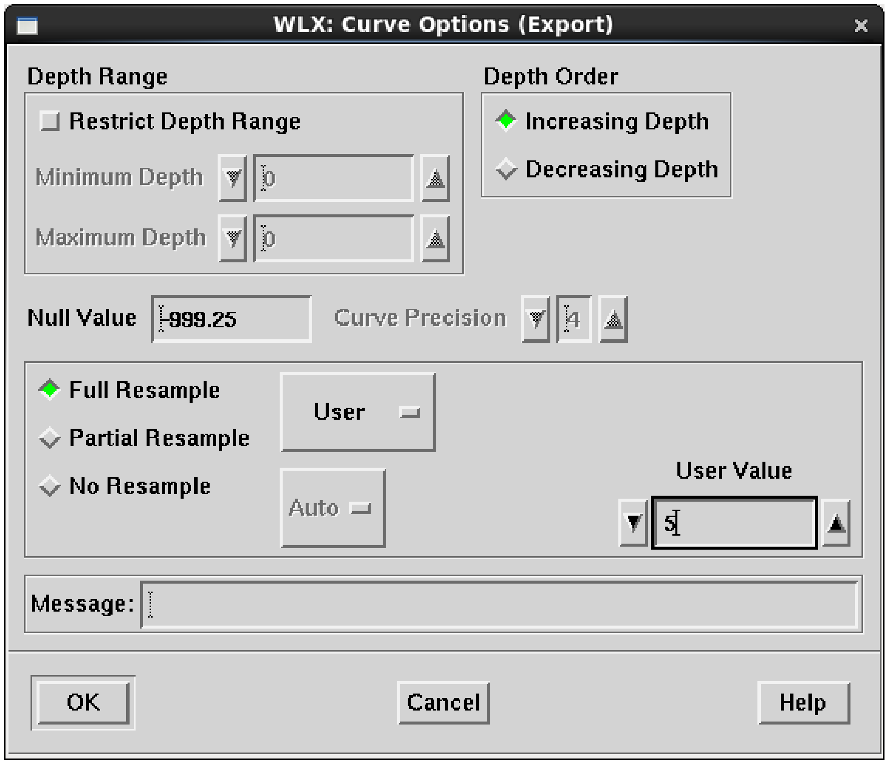
6. Double-click the **Curves** branch and select the **SN**, **SP**, and **LN** curves by holding down the **Control** key and clicking **MB1**. Click **Done** to dismiss the List of Curves Window. Click **Close** to dismiss the Well Tree window.



7. Select **Options** > **Curve** to change the Resample Curve option.

   - Toggle on **Full Resample**.
   - Select **User** from the drop-down list.
   - Set the User Value to **5**.

- Click **OK**.



8. Select **Control > Export** to export the data. DLIS files are binary, so you cannot view your export in an xterm window.

Exporting Data with the owxWellsTops Format

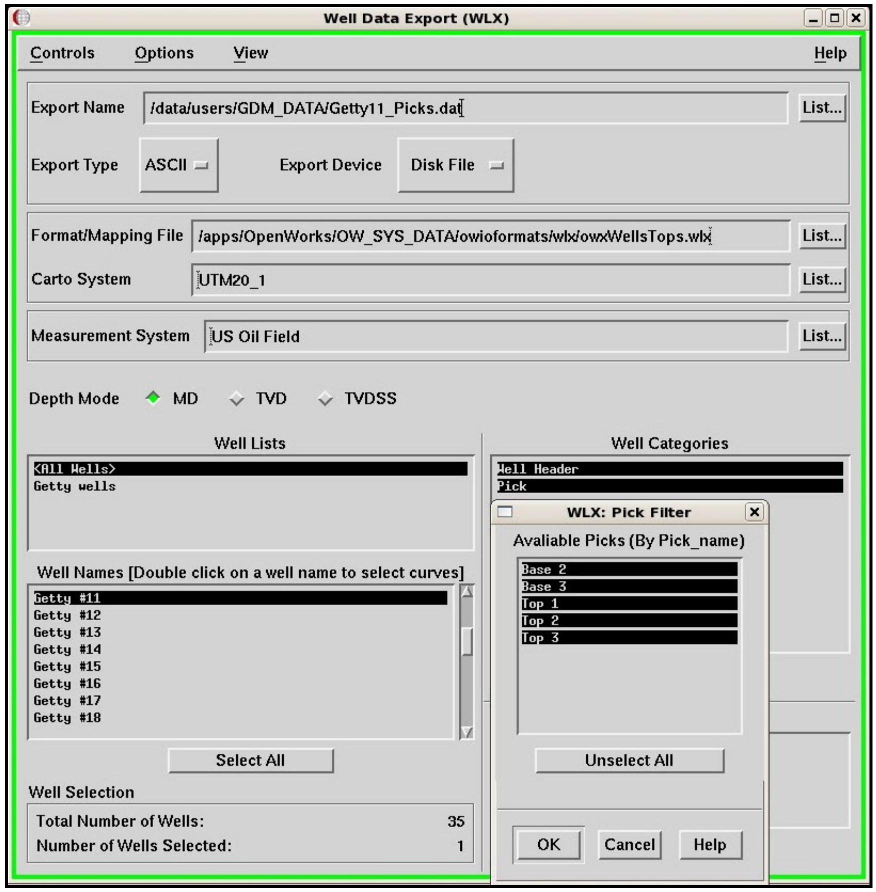
This exercise shows how to use the owxWellsTops format to output picks for a selected well.

1. Change the Export Type to **ASCII**.

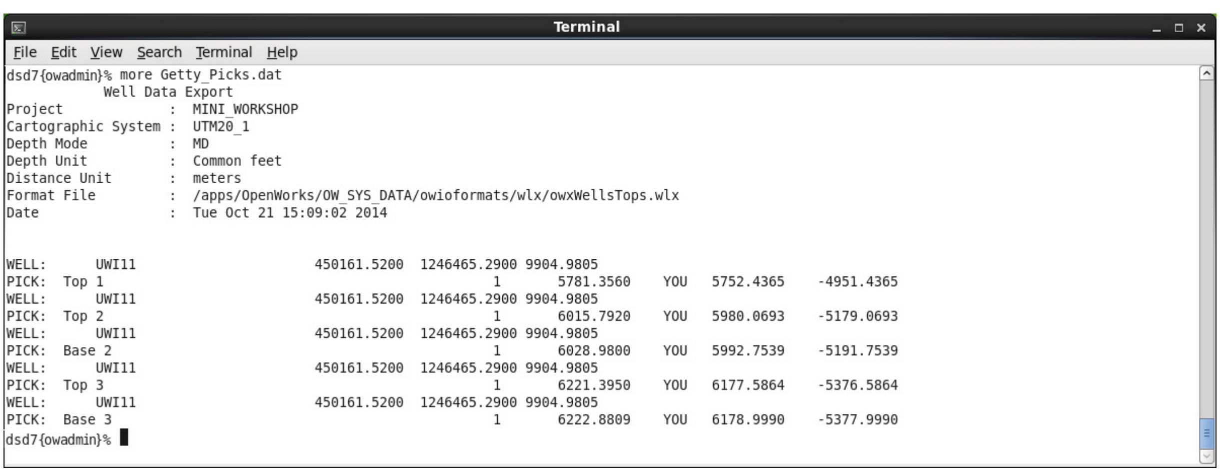
2. Use the **Format/Mapping File List** button to change the selected format file to **owxWellsTops.wlx**.

3. Select **Getty #11** from the **Well Names** list. Make sure that the **Well Header** and **Pick** categories are highlighted.

4. Select **Options > Pick** to verify that the five Top and Base picks are selected. Once the verification is complete, click the **OK** button.



5. Export the data to an ASCII File named **Getty11_Picks.dat**. Select **Control > Export** to export the file. To view your export from an xterm window, type: `more Getty11_Picks.dat`.



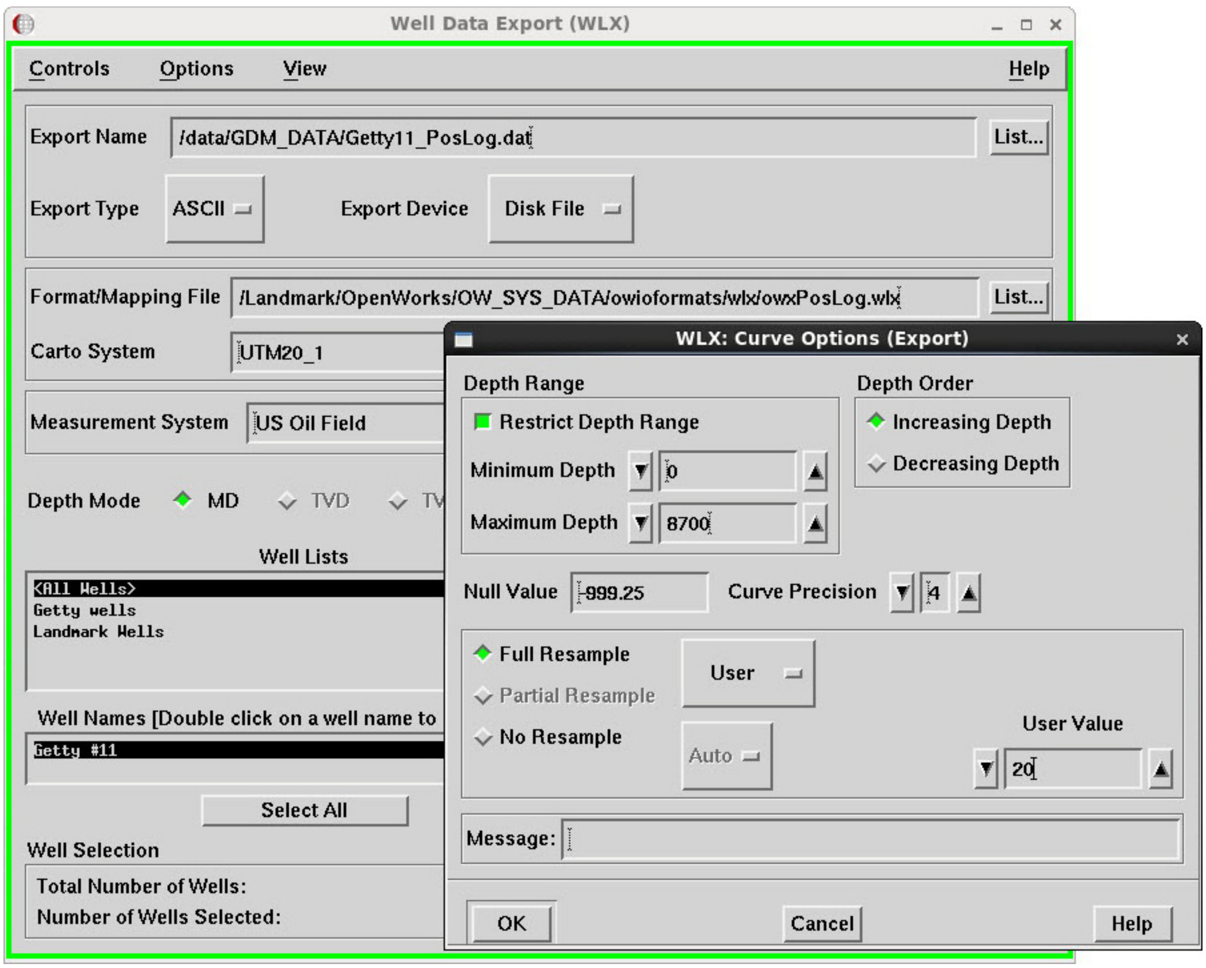
Exporting Data with the owxPosLog Format

In this exercise you use the owxPosLog format to output the position log for a selected well.

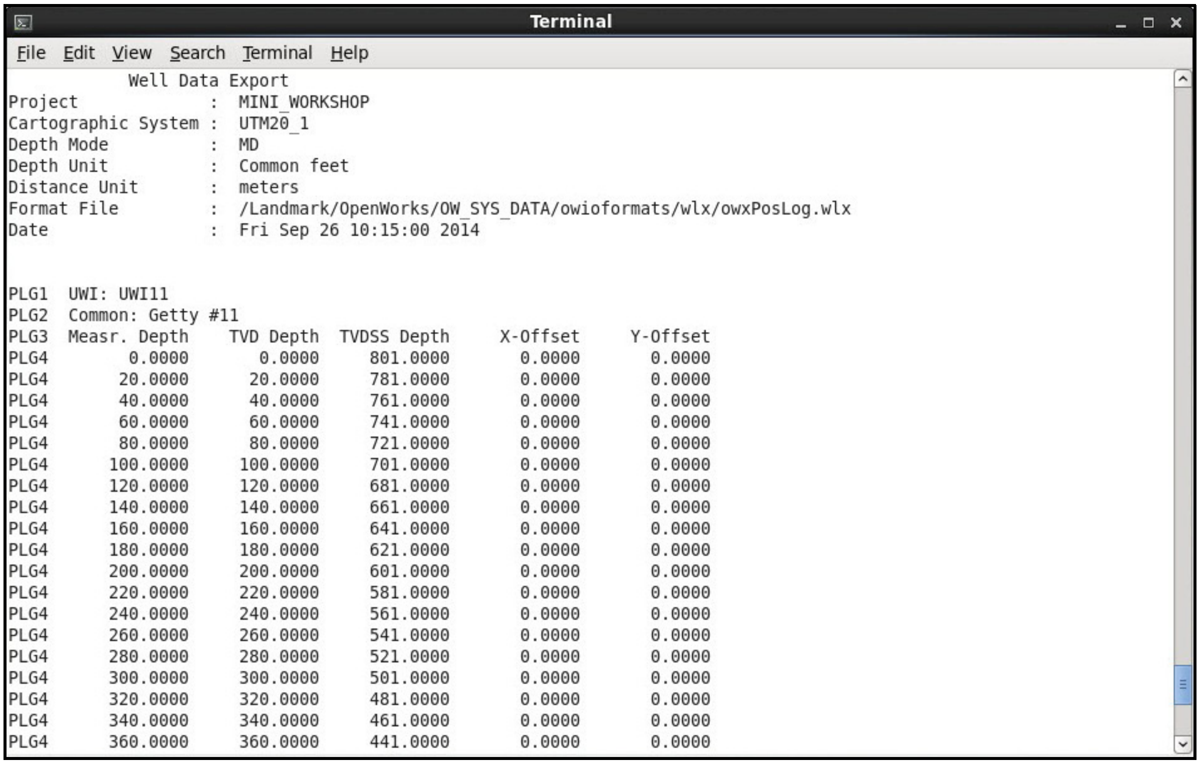
1. Use the **Format/Mapping File List** button to select **owxPosLog.wlx**.

2. Make sure that well **Getty #11** is still selected, and that the **Well Header** and **Pos Log** categories are highlighted.

3. Under **Options** > **Curve** set the following parameters, and then click **OK**.



4. Export your format to an ASCII File named **Getty11_PosLog.dat**. In an xterm window, type **`more Getty11_PosLog.dat`** to view your exported data.



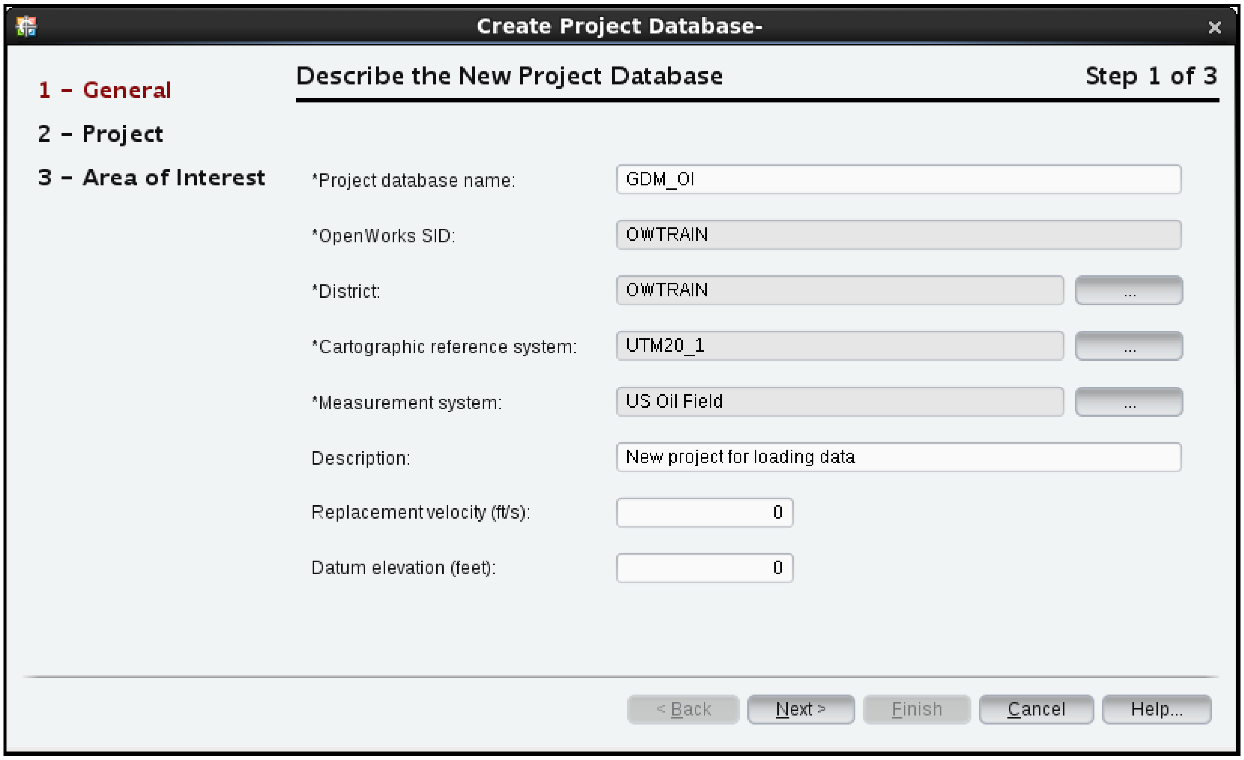

```
            Well Data Export
Project            :  MINI_WORKSHOP
Cartographic System :  UTM20_1
Depth Mode         :  MD
Depth Unit         :  Common feet
Distance Unit      :  meters
Format File        :  /Landmark/OpenWorks/OW_SYS_DATA/owioformats/wlx/owxPosLog.wlx
Date               :  Fri Sep 26 10:15:00 2014


PLG1  UWI: UWI11
PLG2  Common: Getty #11
PLG3  Measr. Depth    TVD Depth  TVDSS Depth     X-Offset     Y-Offset
PLG4        0.0000       0.0000     801.0000       0.0000       0.0000
PLG4       20.0000      20.0000     781.0000       0.0000       0.0000
PLG4       40.0000      40.0000     761.0000       0.0000       0.0000
PLG4       60.0000      60.0000     741.0000       0.0000       0.0000
PLG4       80.0000      80.0000     721.0000       0.0000       0.0000
PLG4      100.0000     100.0000     701.0000       0.0000       0.0000
PLG4      120.0000     120.0000     681.0000       0.0000       0.0000
PLG4      140.0000     140.0000     661.0000       0.0000       0.0000
PLG4      160.0000     160.0000     641.0000       0.0000       0.0000
PLG4      180.0000     180.0000     621.0000       0.0000       0.0000
PLG4      200.0000     200.0000     601.0000       0.0000       0.0000
PLG4      220.0000     220.0000     581.0000       0.0000       0.0000
PLG4      240.0000     240.0000     561.0000       0.0000       0.0000
PLG4      260.0000     260.0000     541.0000       0.0000       0.0000
PLG4      280.0000     280.0000     521.0000       0.0000       0.0000
PLG4      300.0000     300.0000     501.0000       0.0000       0.0000
PLG4      320.0000     320.0000     481.0000       0.0000       0.0000
PLG4      340.0000     340.0000     461.0000       0.0000       0.0000
PLG4      360.0000     360.0000     441.0000       0.0000       0.0000
```

5. Compare this file with the one you exported from Well Data Manager.

Importing the Output to a New Project

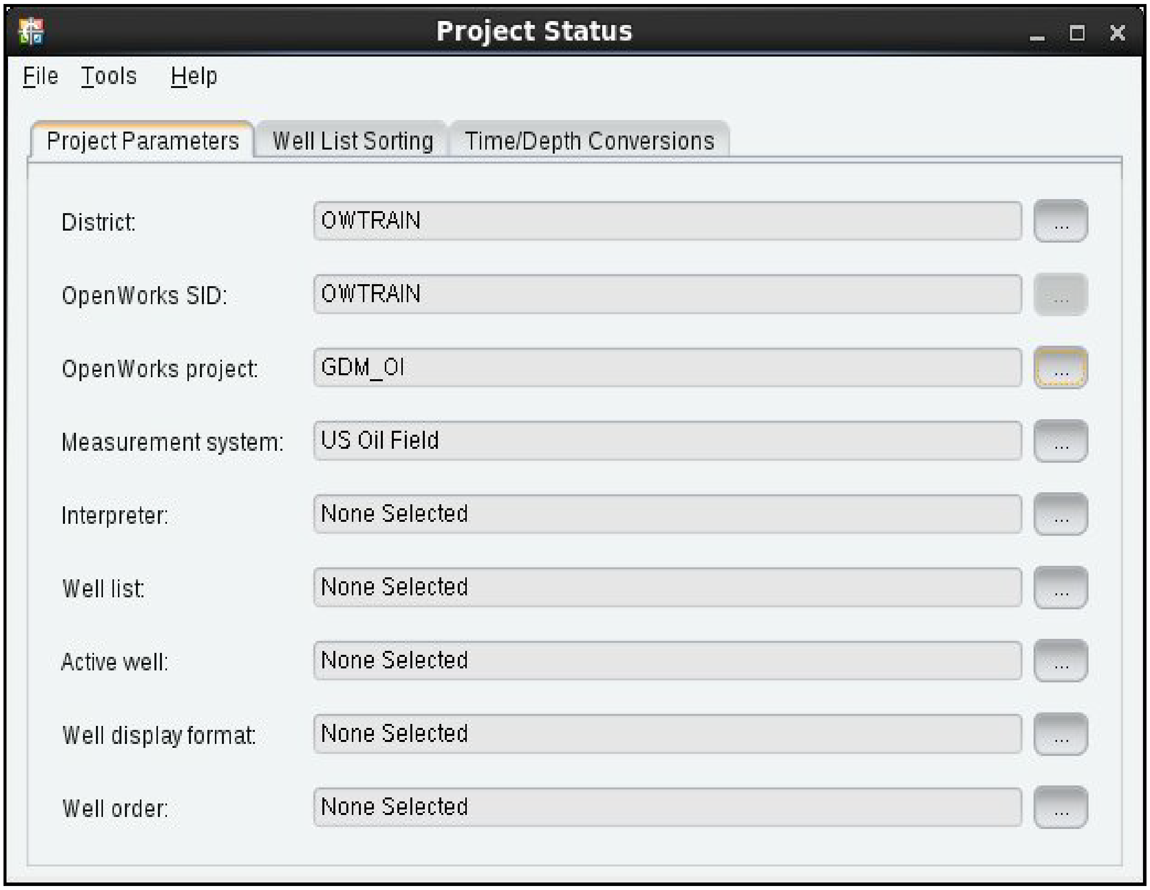
In this exercise you change your project, and then import the output from the previous four exports using predefined formats.

1. Create a new project **GDM_OI** for loading this new data.



2. Use Project Status select **GDM_OI** as the OpenWorks project.

3. From the OpenWorks command menu, select **Project > Interpretation ID Manager** to define and set a new Interpretation ID for your new project. Verify the project status in all the settings.

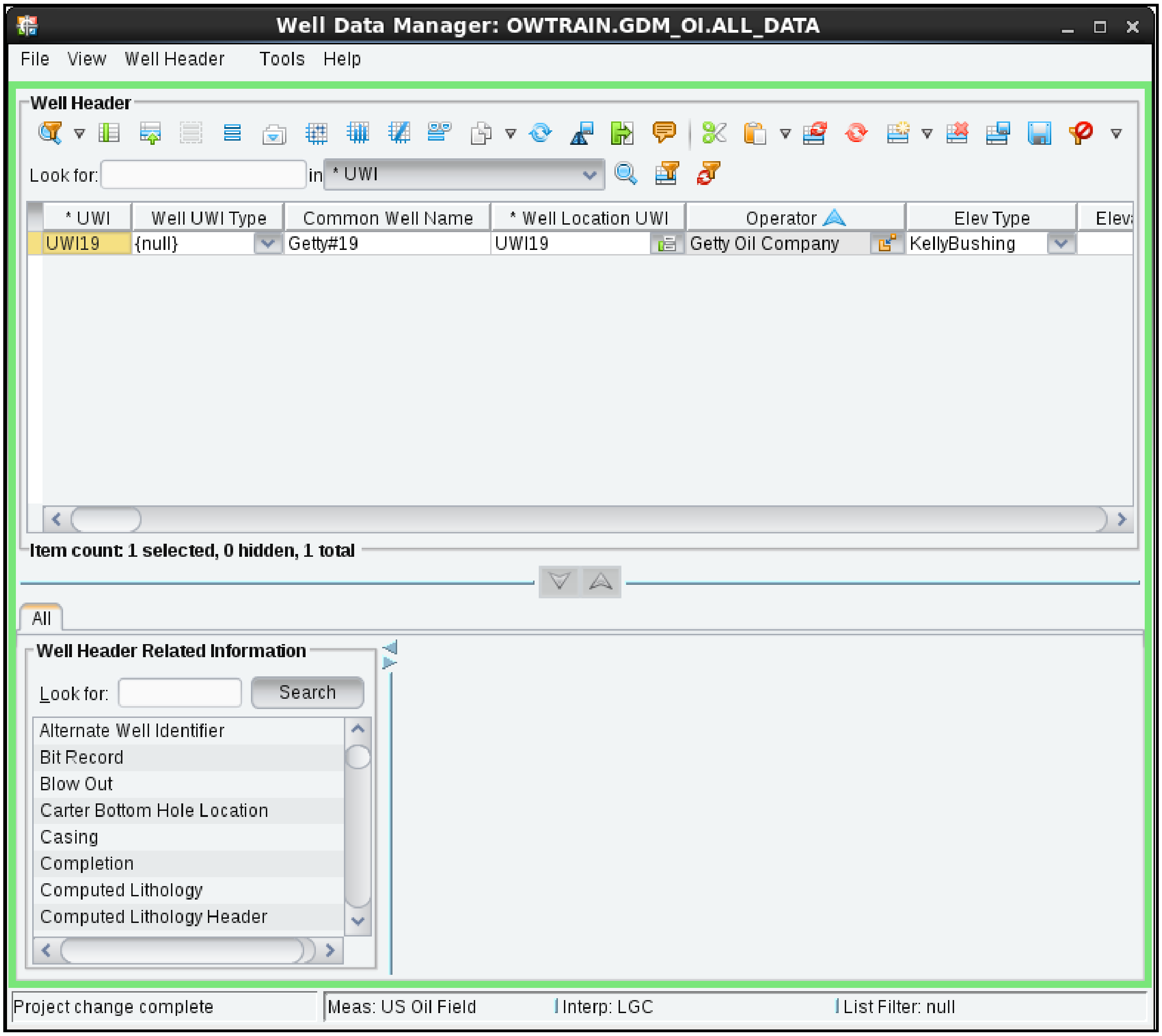


4. Use the ASCII Loader to load the exported Getty #19 well header data into your new project. Use the following parameters.

Input File	Getty19_Header.dat
Format	owxAll.wdl
Measurement System	US Oil Field
Depth Unit	Feet
Depth Mode	MD
CRS	UTM20_1

5. Click **File > Load** and click **OK** to insert Getty #19 into the database.

6. Open Well Data Manager to verify the import.



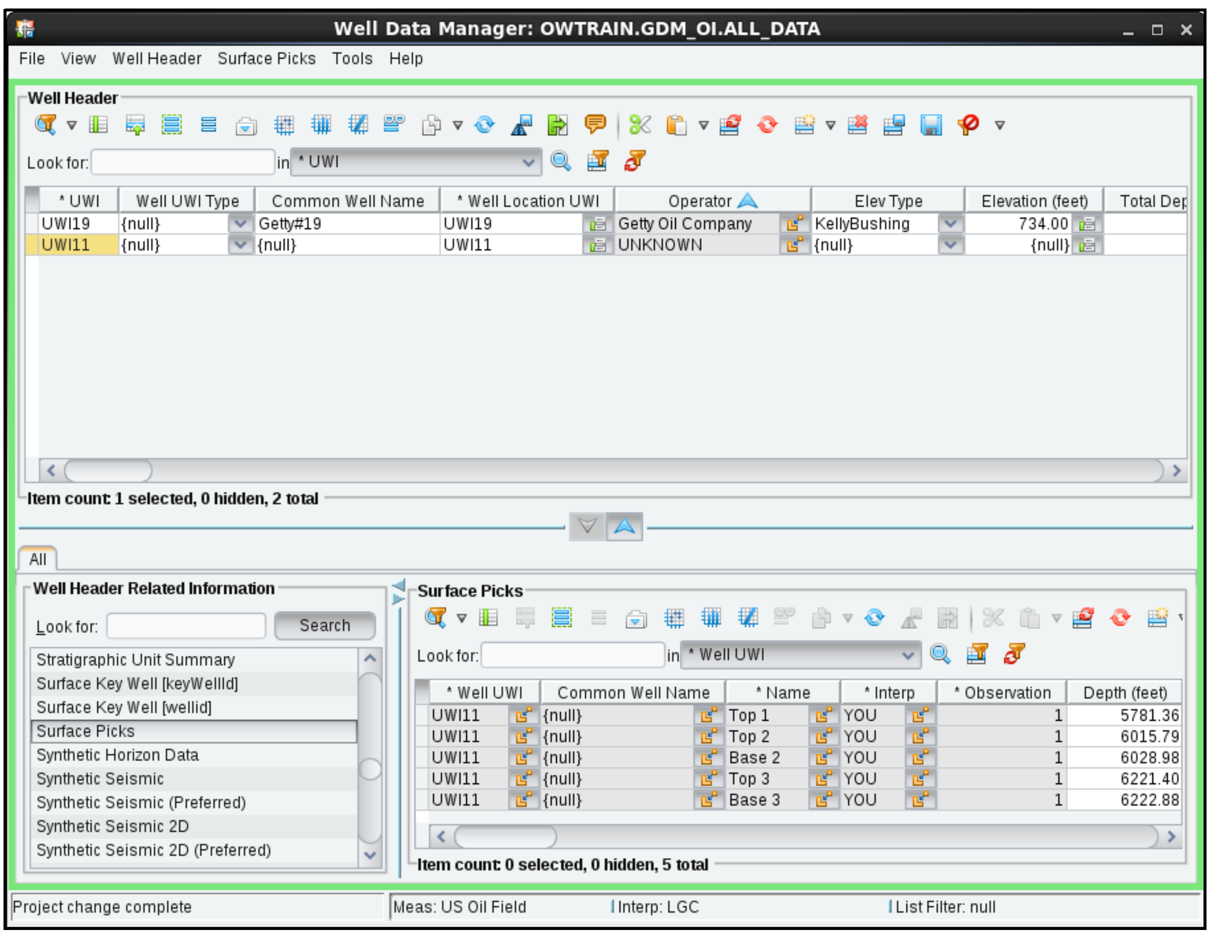
7. Use the ASCII Loader again to load the exported Getty #11 well picks into your new project. Change the following parameters.

Input File	Getty11_Picks.dat
Format	owxWellTops.wdl

8. Click **File > Load**.

9. In the Well Data Manager, click the **Filter data** button to choose **All Well Header** and see the new well loaded.

10. Highlight **UWI11**, and open the **Surface Picks** form to examine the pick data.



11. Load the file **Getty11_Header.dat** using the **owxAll.wdl** format file in ASCII Loader.

12. Exit from the ASCII Loader.

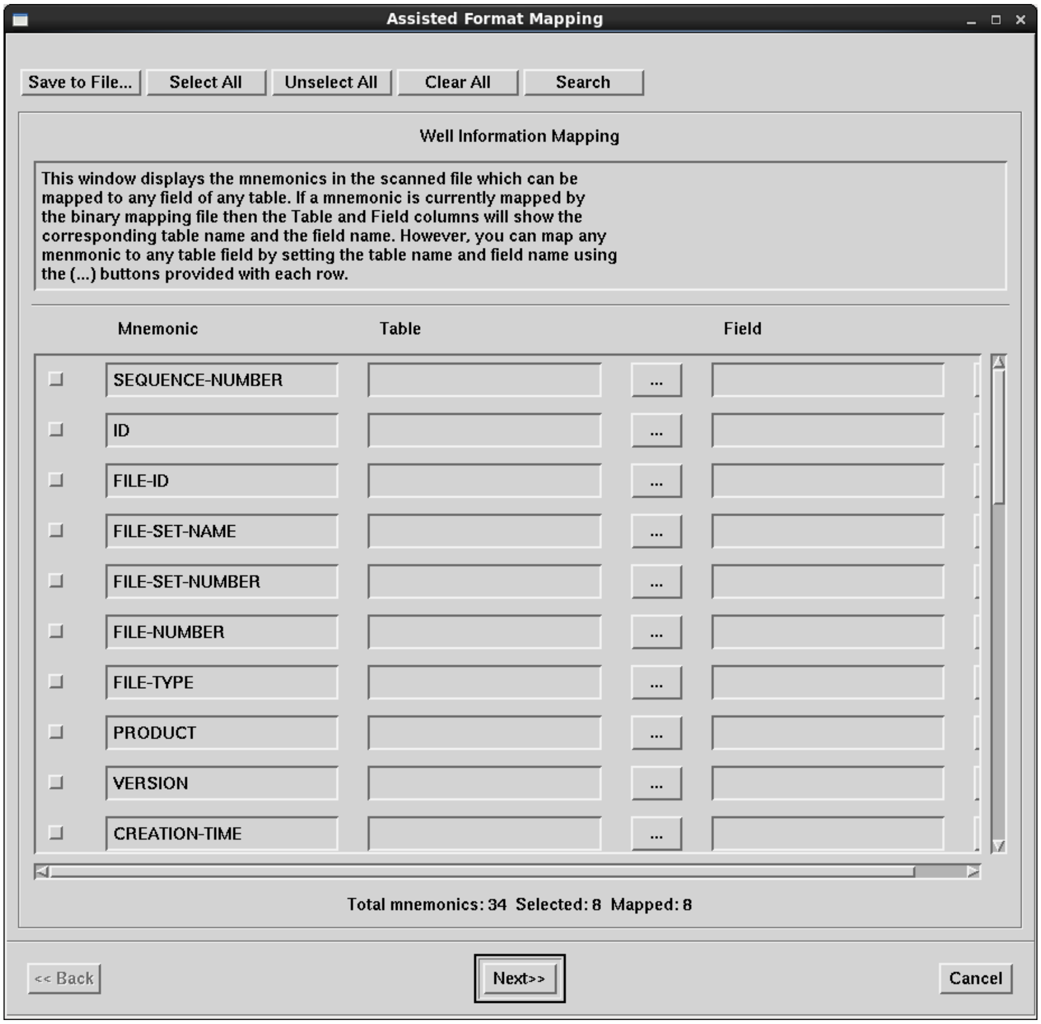
13. Use the Curve Loader (**Data > Import > Curve Import (Classic)**) to load the exported **Getty #19** log curves into the project (GDM_OI). Use the following parameters.

Format Type	DLIS
Input Data File	Getty19.dlis
Format File	Halliburton.bcl

14. Click **File > Scan** to verify that curves SN and SP are loaded into well UWI19.

15. Select **File > Assisted Format Mapping** to view the list of available parameters.

    Notice that eight Well Information Mapping mnemonics are mapped.



16. Click **Next** to view the petrophysical parameters that are mapped.

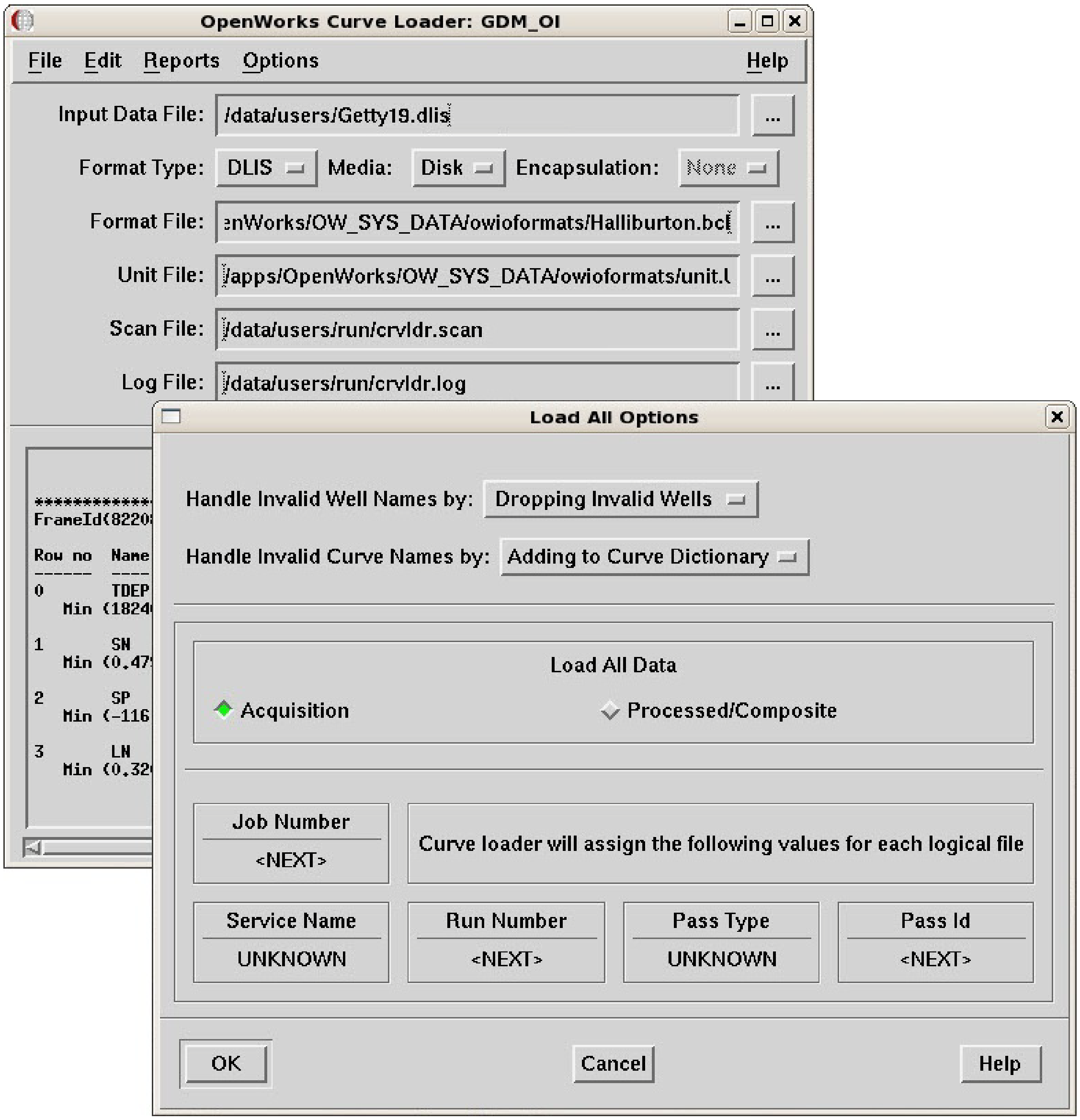
17. Toggle on the following:

    - WN (WELL NAME)
    - FN (FIELD)
    - APIN (UWI)
    - CWN (COMMON WELL NAME)
    - TDL (TOTAL DEPTH)

18. No mnemonics should be selected on any other screens. On the List of Equipment in Input screen, select **Save to File** and choose **Save only mapped rows**. Click **OK**. Save the file as **Halliburton_edited.bcl**. Click **Next** and then **Finish** to close Assisted Format Mapping.

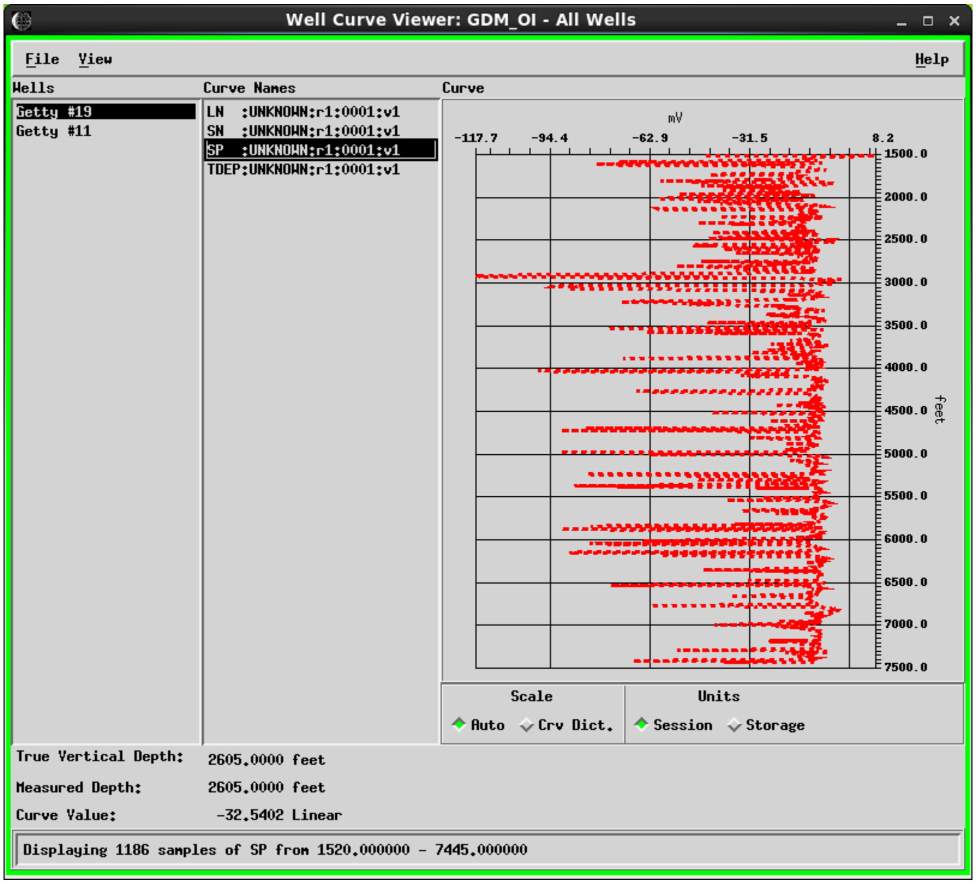
19. Select **Halliburton_edited.bcl** as the Format File.

20. In the Curve Loader window, select **File > Scan** and **File > Load All.** Set Handle Invalid Well Names by to **Dropping Invalid Wells** and set Handle Invalid Curve Names by to **Adding to Curve Dictionary**. Curves should be loaded as Acquisition data.



21. Click **OK** to load the curves. If you see a Confirmation dialog box, click **Update None** and **Continue**.

22. Use **Well Curve Viewer** to verify that curves were loaded for Getty #19.



23. Exit from the Well Curve Viewer.

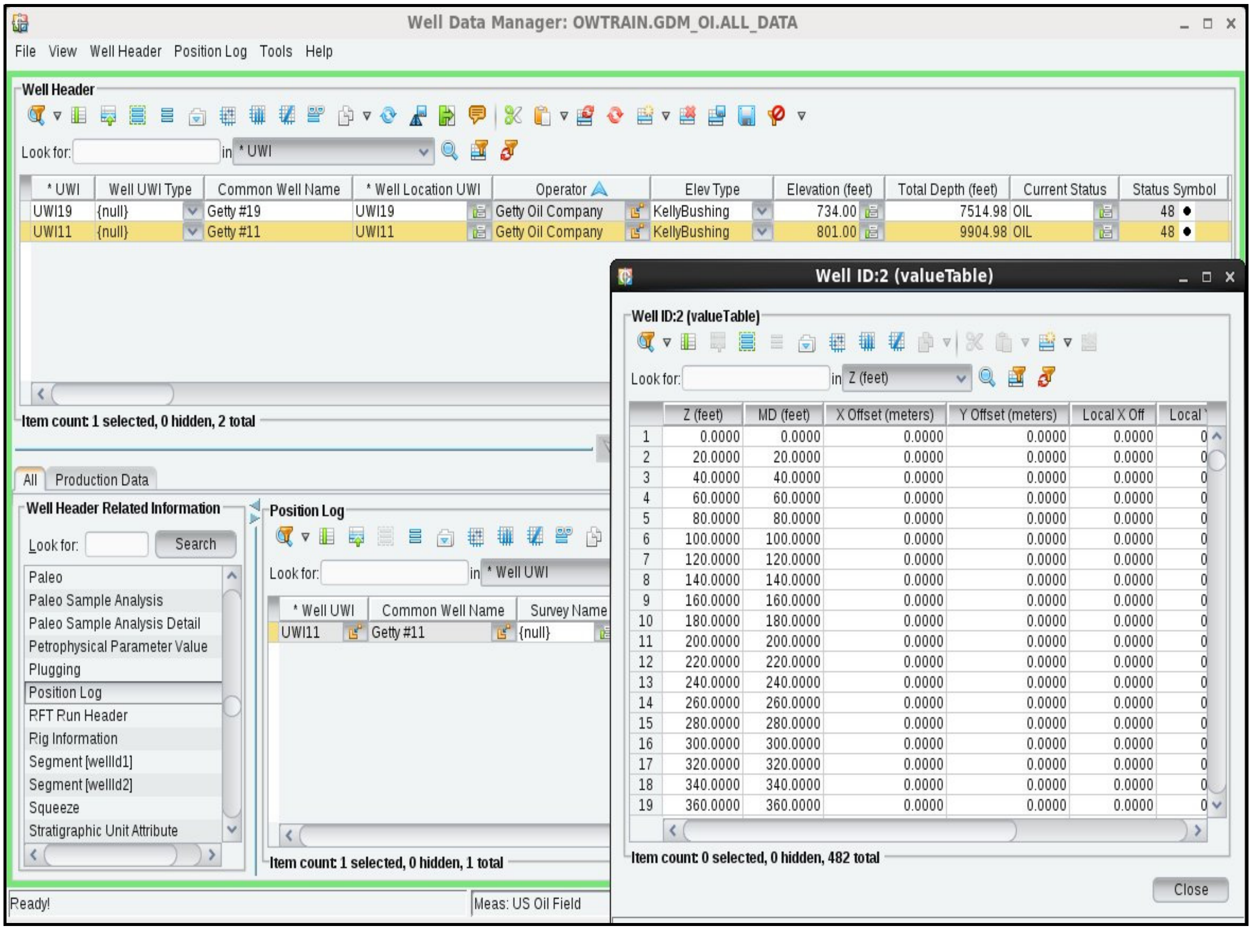
24. Use the Curve Loader to load the exported Getty #11 position log into your new project. Use the following parameters.

Format Type	ASCII
Input Data File	Getty11_PosLog.dat
Format	owxPosLog.all

25. Click **File** > **Scan** to verify that **X**, **Y**, **TVD-Depth**, and **MD** will load into well UWI11.

26. Select **File** > **Load Select**. Load the well UWI11 with the curves **X-Position**, **Y-Position**, **TVD-Depth**, and **MD**.

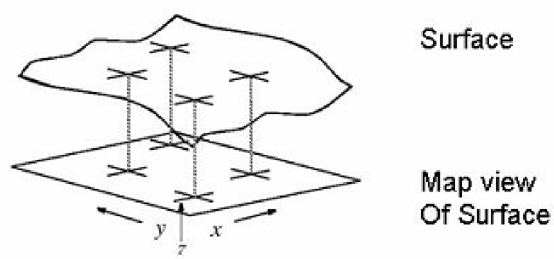
27. Use Well Data Manager to verify the load. Use the Position Log Data form. You can see the tables values by clicking on the ellipsis (...) button.



28. Exit from the Curve Loader and the Well Data Manager.

Importing Point Sets

- A point set is any random group of points that describes a surface, strat unit, or fault. Point sets are created and used in many Landmark applications, including SeisWorks, StratWorks, PetroWorks, and Z-MAP Plus™ software.
- Each point has an X-Y coordinate that represents its map location and a Z coordinate that typically represents depth, but may represent other attributes such as porosity, density, or time.
- Point sets are read and written in a fixed format.



Typical Pointset

Point set files can be created by exporting columns of XYZ data in spreadsheet format from the Well Data Manager. These spreadsheet (*.xls*) files can be converted to space-delimited (*.prn*) files and loaded into an OpenWorks project with a user-defined format in the Data Import tool.

You can also generate point set files by exporting the well data from an existing OpenWorks project with a Landmark-predefined format file in the Data Export tool. These point set files can easily be loaded into another OpenWorks project using the same Landmark format in the Data Import tool.

Exercise 9-3: Importing a Point Set Created in Spreadsheet Format

Data files are commonly created in Excel spreadsheets, or can be exported to *.xls* formats from a table in the Well Data Manager. A point set file consists, at minimum, of three columns of data: X(Easting), Y(Northing), and Z(z value). A typical point set file is shown below.

X - FIELD (feet)	Y - FIELD(feet)	Z - FIELD(feet)
2828037.5	928094.8	71.0
2938324.8	924374.4	-16526.0
2973595.8	954869.2	-7950.0
3025578.0	982956.9	-10761.0
3025765.5	990368.1	-3226.0
3028180.8	986218.2	-4077.0
3212010.5	-582119.25	-9759.0
3237682.5	480849.75	-3404.0
3241571.5	481158.4	-4490.0
3828766.5	-282952.25	-11777.0
4005103.0	-210582.11	-3933.0
4216510.0	136289.52	-15886.0

In this exercise, you will use the Data Import tool to interactively build a custom format file for importing a basic point set data file into an OpenWorks project database.

1. Change the OpenWorks project to **DATAIO_TRAINING.**

2. Open the Data Import tool by selecting **Data** > **Import** > **Data Import** from the OpenWorks command menu.

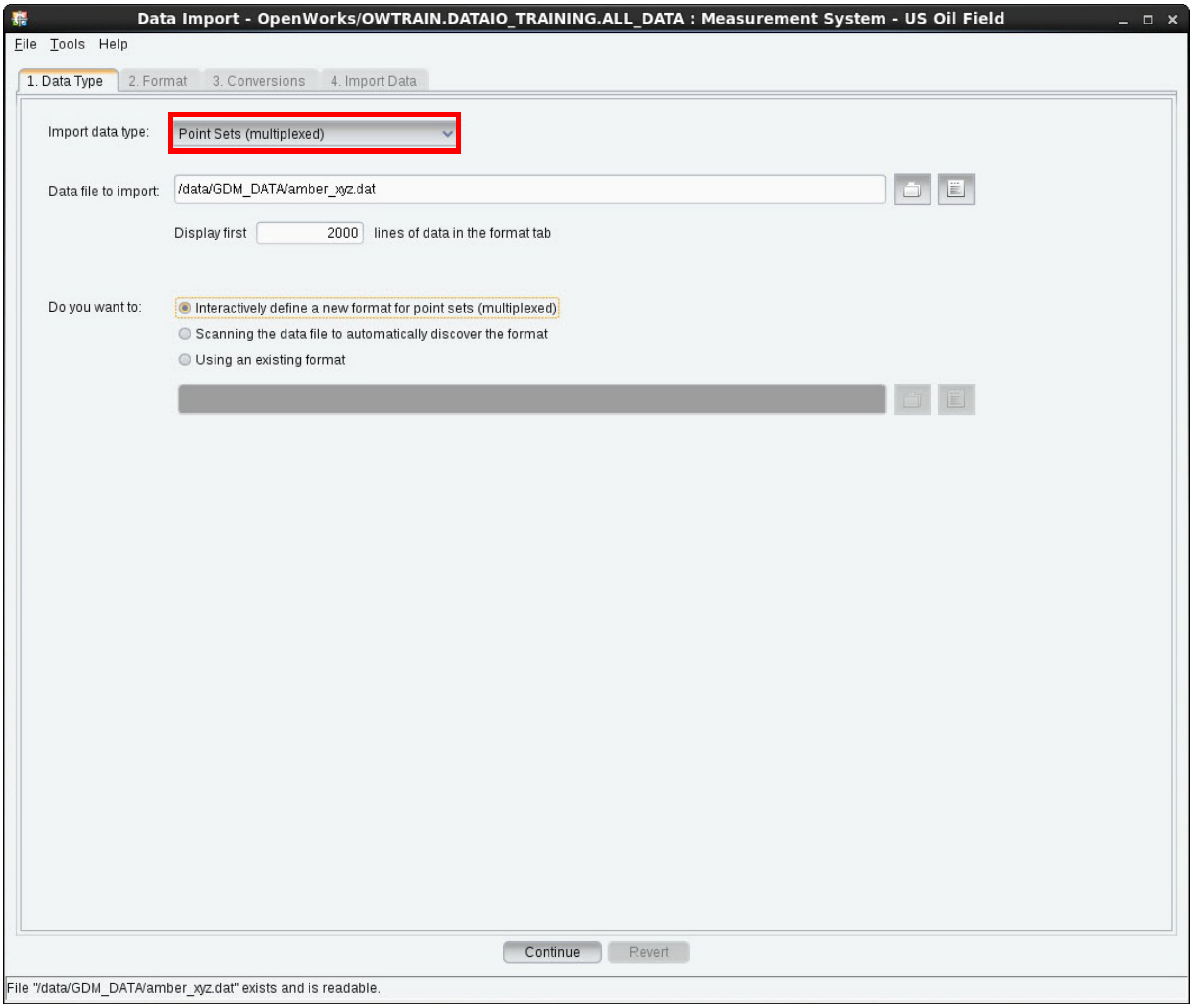
3. In the Data Type tab window of the Data Import tool:

    - For **Import data type**, select **Point Sets (multiplexed)**.

    - For **Data file to import**, select **amber_xyz.dat**.

    - Select the **Interactively define a new format for point sets (multiplexed)** option.

- Click **Continue** to finalize the selections made in this tab window and to proceed to the next step.



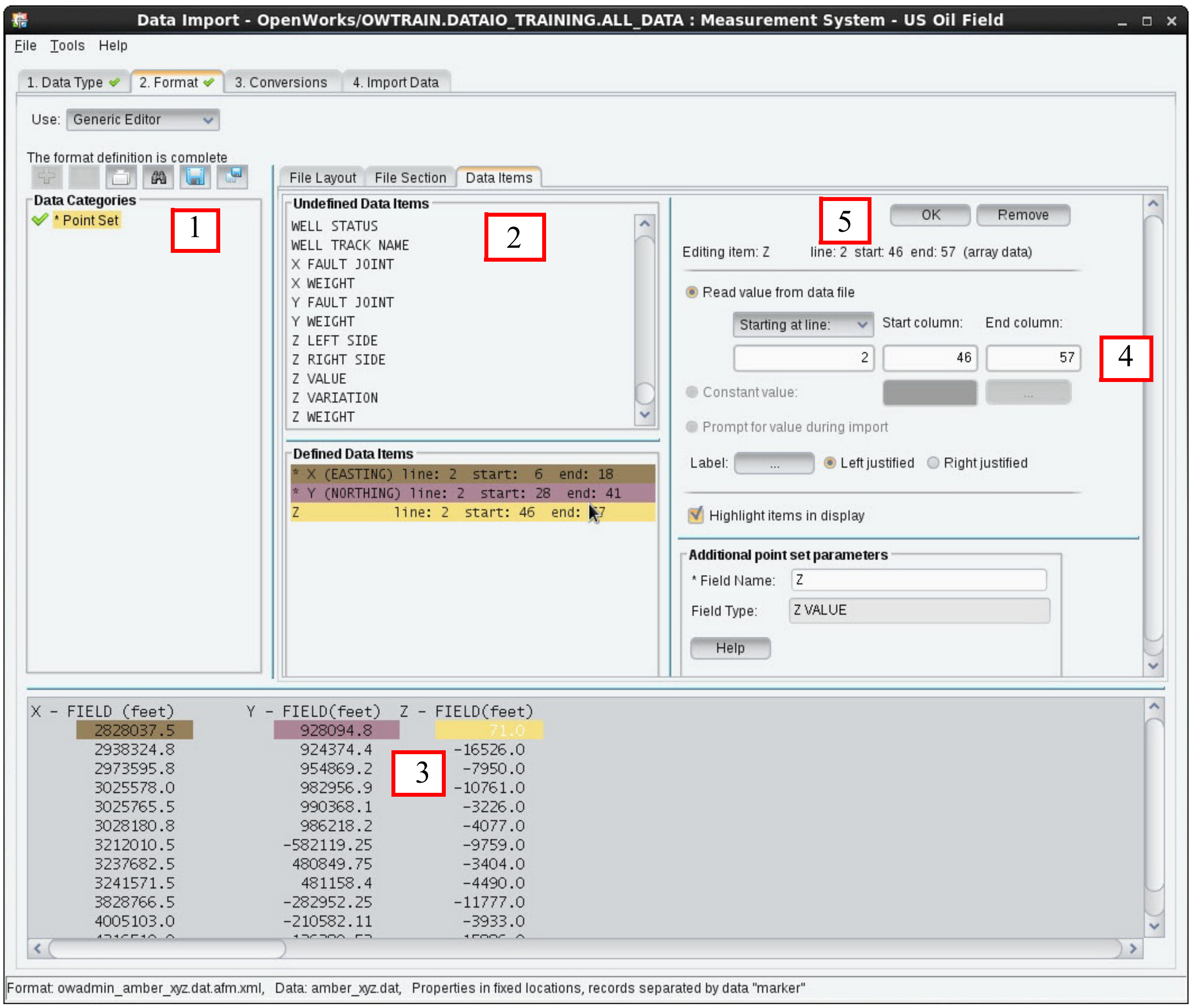
4. The program takes you to the Format tab window, where you will build a custom format file for the point set data. Notice the three tabs in the upper-middle pane of the Format window: File Layout, File Section, Data Items. It is best to move sequentially among these tabs while building the format file. The data file is previewed in the bottom pane; its data fields are highlighted in the process of defining the data items for the format file.

   a. File Layout tab – set the **Input data fields** to **Fixed width**.

   b. File Section tab – select **Indicated by the number of point set section in this type of input data file**; toggle on: **one**.

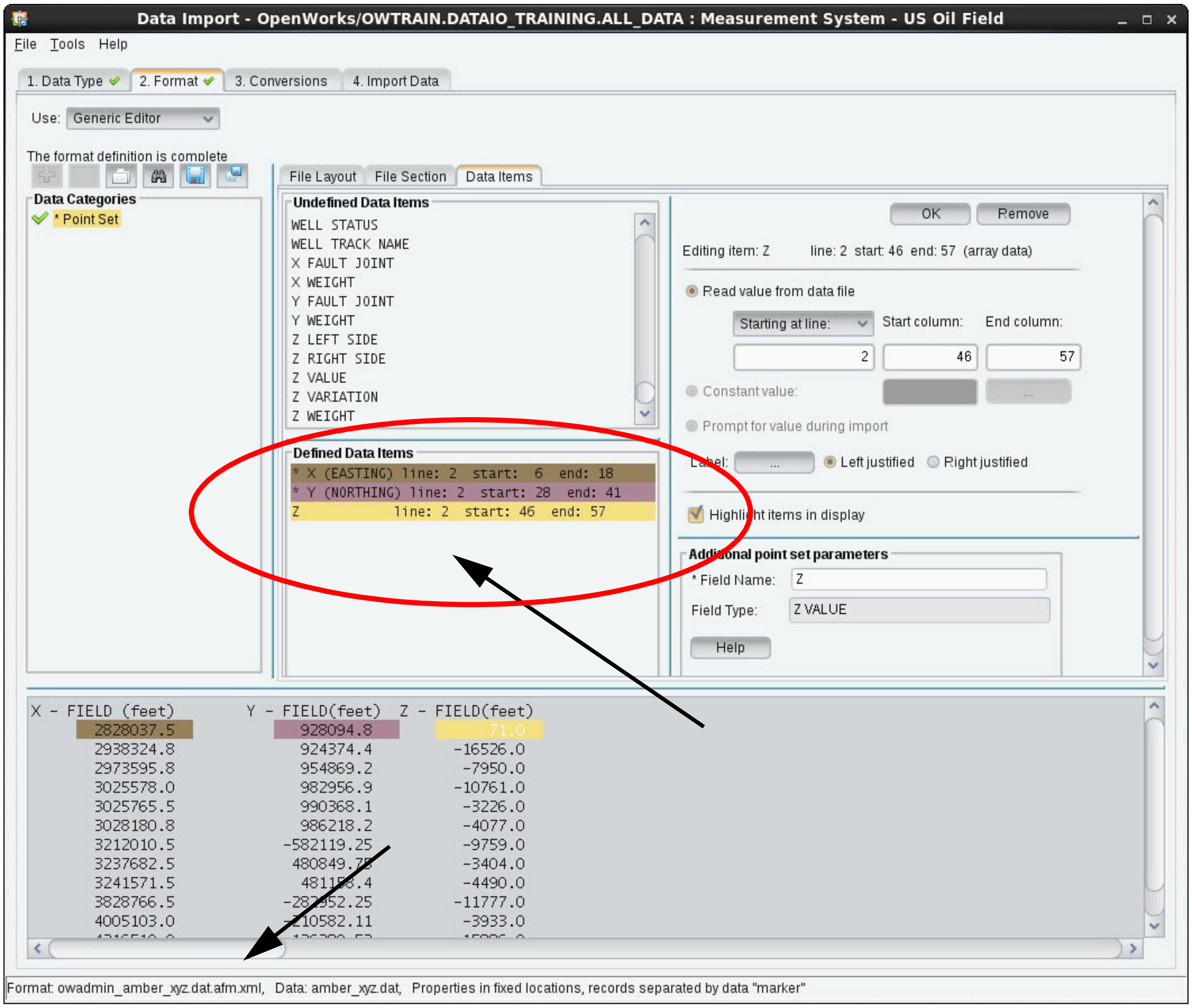
c. Data Items tab – work between the Undefined Data Items box and the data preview box to populate the fields in the Format Editor box (upper right pane) as follows:

- Select **Point Set** in the Data Categories box.
- Select **Y (NORTHING)** in the Undefined Data Items box.
- Paint the first line of data for the **Y field**.
- Values for Start column and End column in the format editor box correspond to the painted columns for the Y field.
- Click **OK** to add **Y (NORTHING)** to the Defined Data Items box.

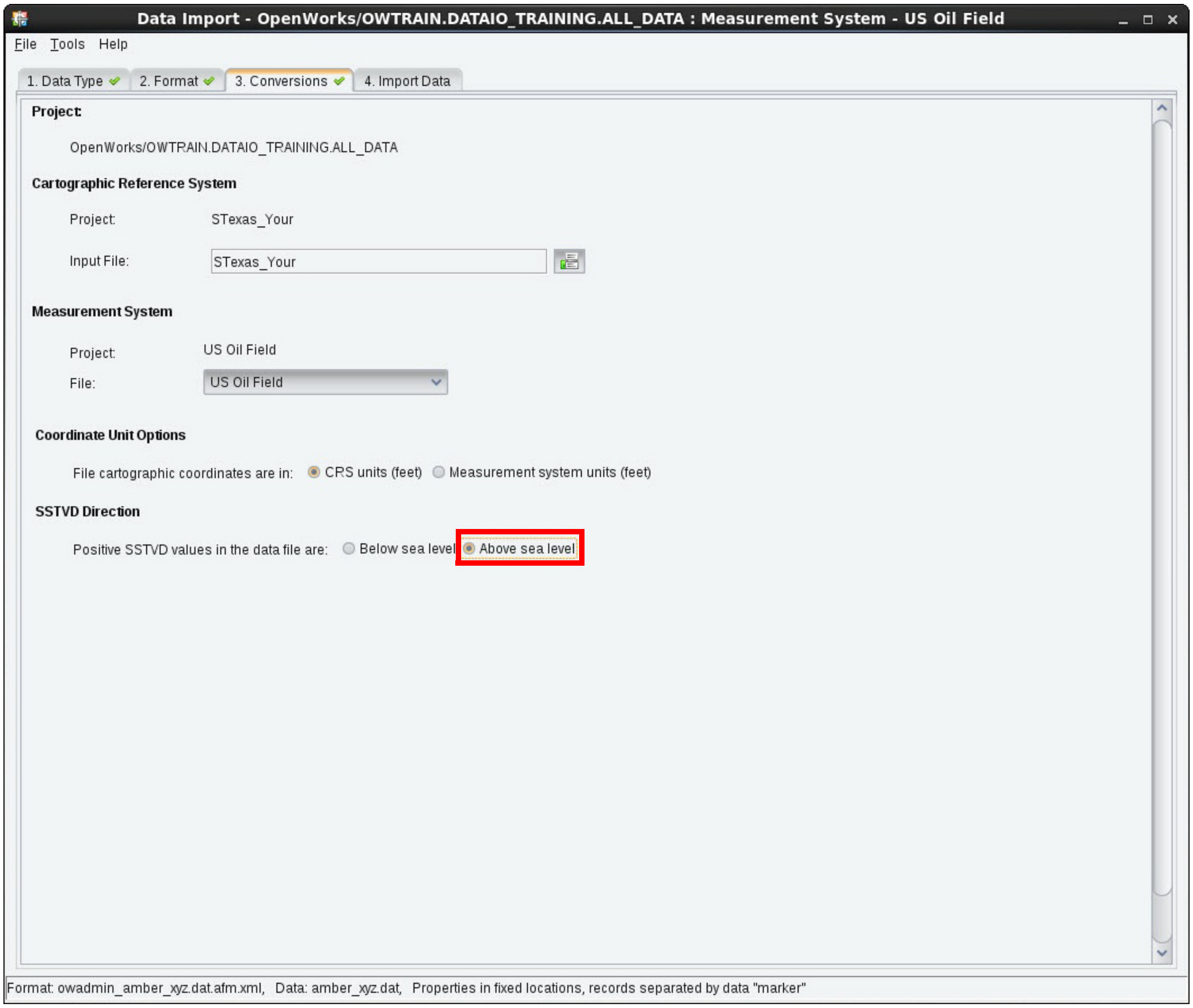


- Continue in the same manner to define **X (EASTING)**. Paint the **Z VALUE** in the same manner as Y and enter **Z** in the **Field Name** field.

- **Save** your format to the default file name. Your format file will look like the picture below.

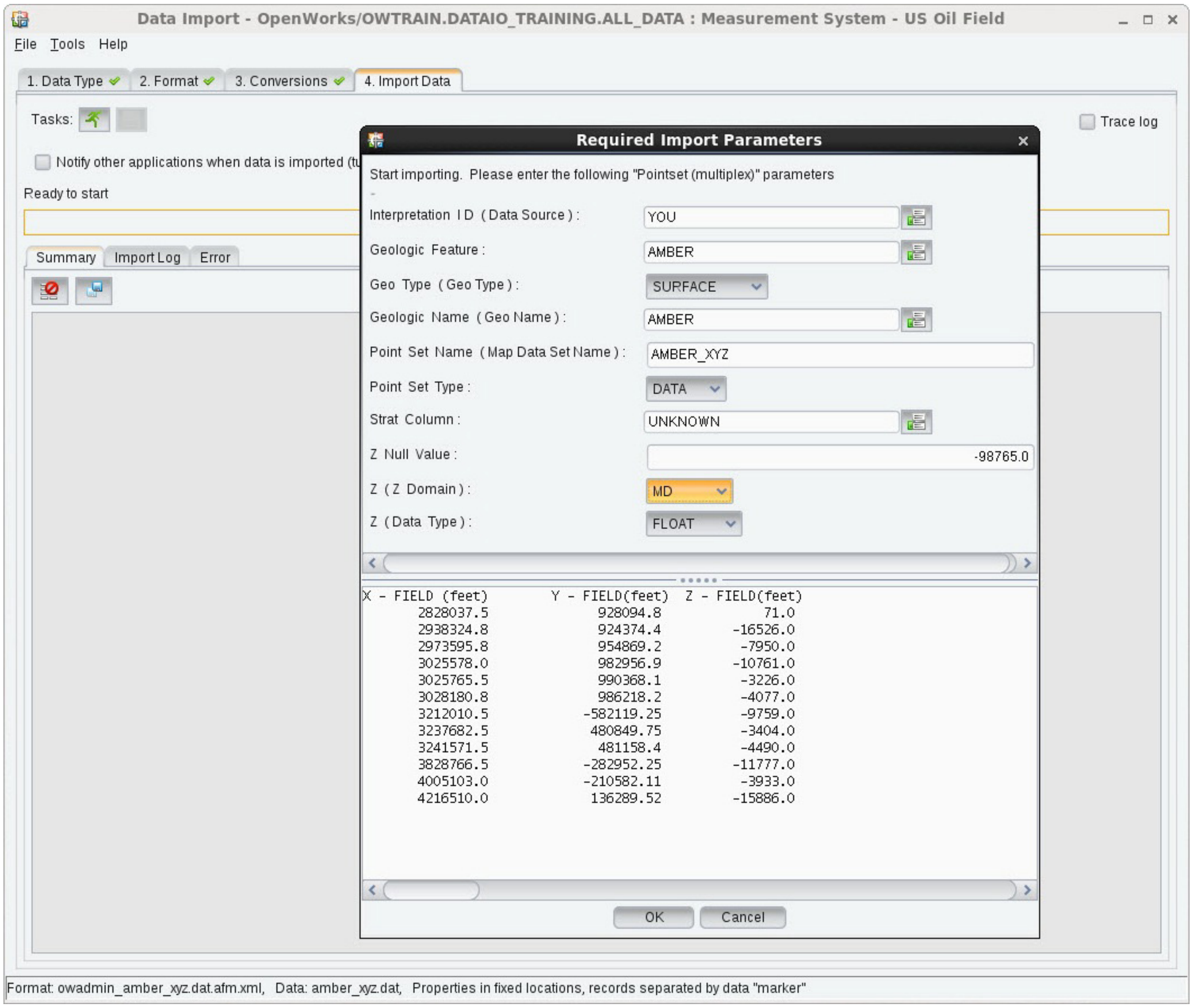


5. Click the **Conversions** tab. Accept the **default values** for the input file CRS, the Coordinate Unit Options and the Measurement System. Change the **SSTVD Direction** to **Positive values: Above sea level.**

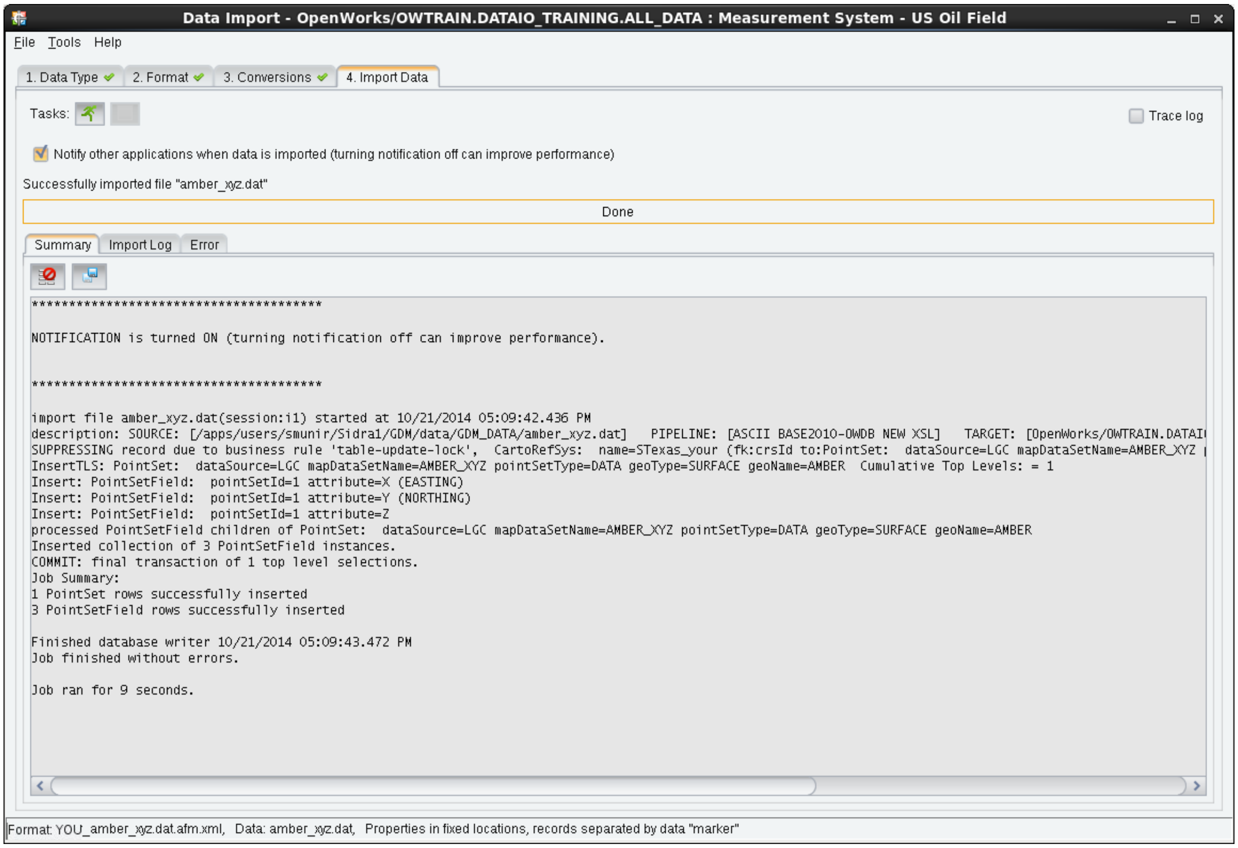


6. Select the Import Data tab and click the **Run import job** icon .

7. A dialog box for **Required Import Parameters** appears. All fields designated with an asterisk (*) must be filled. Enter the values shown in the picture below. Click **OK** to accept the Required Import Parameters and start the Import process.



8. View the information in the Summary, Import Log, and Error tab windows. The Error tab window should display “Job finished without errors.” The Summary tab window states the number of point set rows and point set fields imported into the database. Select **File > Exit** to close the Data Import tool.



Exercise 9-4: Importing a Point Set Created with a Landmark Predefined Format

In this exercise you will use the Data Import tool to import a point set to the OpenWorks project database. This point set flat file was generated by the Data Export tool using a Landmark-predefined format file. The Data Import tool can automatically detect the format of the point set file and use the same Landmark format file to load the data set into the OpenWorks project.

1. Open the Data Import tool by selecting **Data > Import > Data Import** from the OpenWorks command menu.

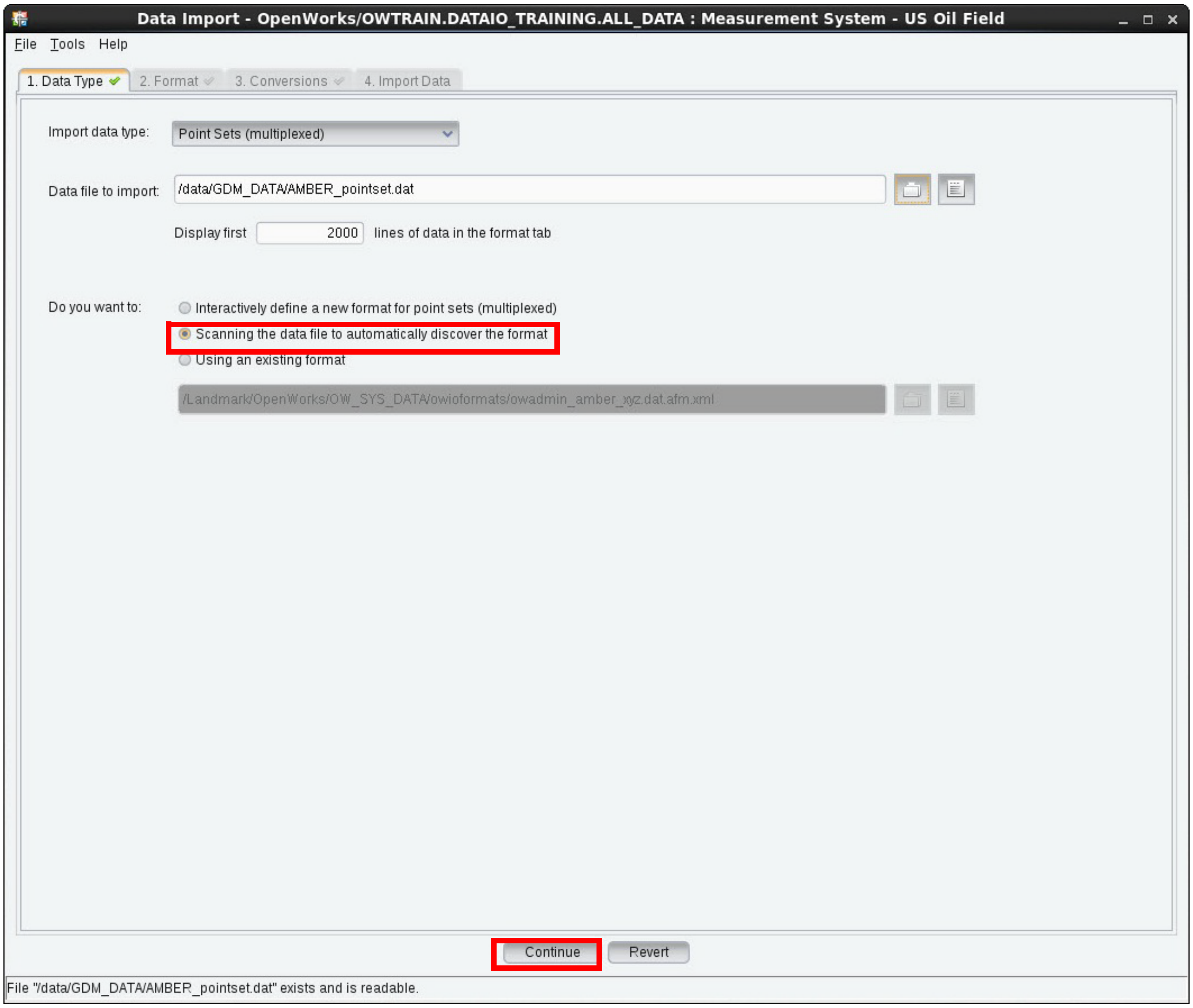
2. In the Data Type tab window of the Data Import tool:

    - For **Import data type**, select **Point Sets (serial)**.

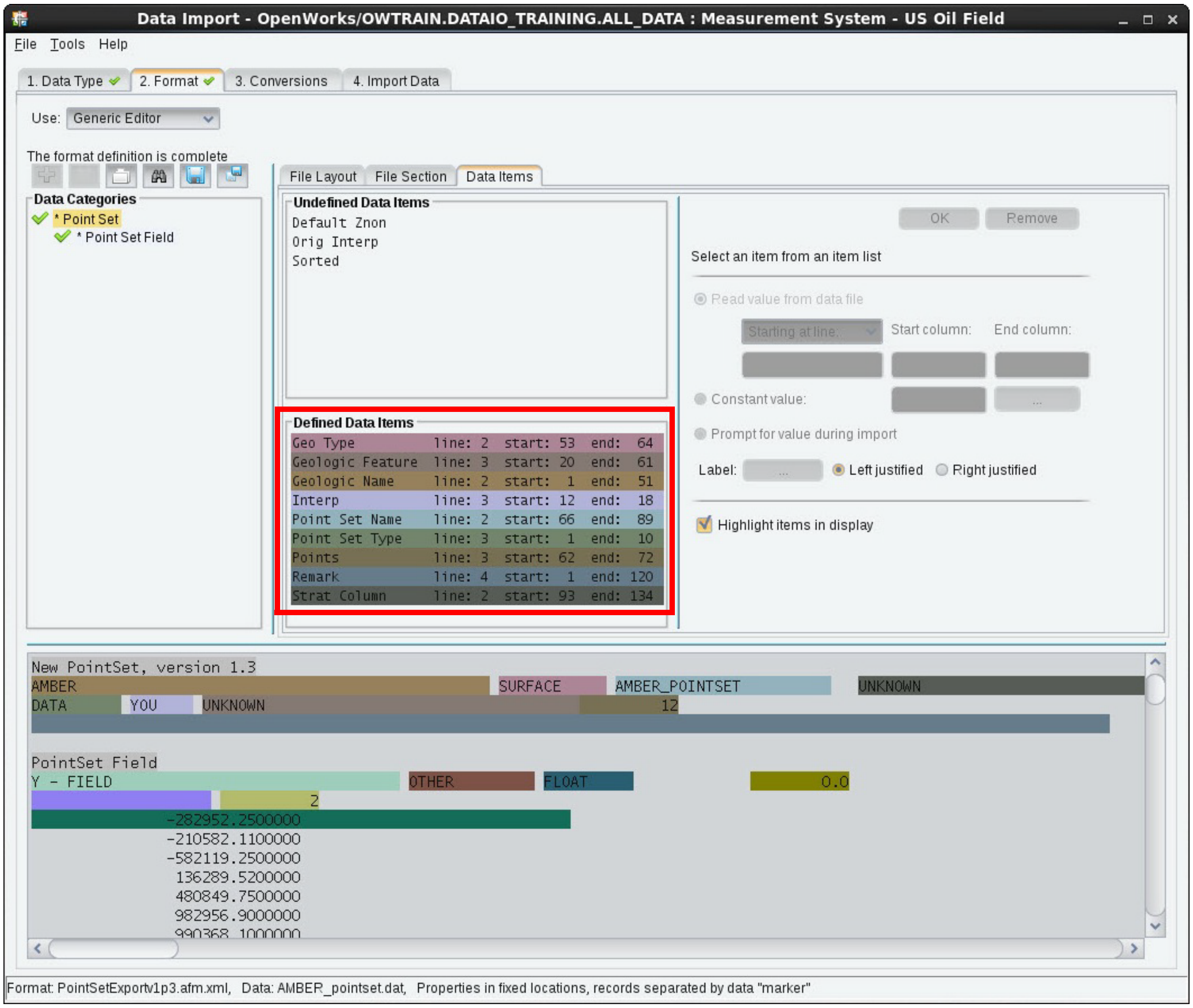
    - For **Data file to import**, select **AMBER_pointset.dat**.

    - Select the option **Scanning the data to automatically discover the format.** The AMBER_point set.dat file is a set of pick values for the AMBER surface loaded in a previous exercise (FORMTOPS.txt). The ASCII file was created using the OpenWorks **Standard export format**.

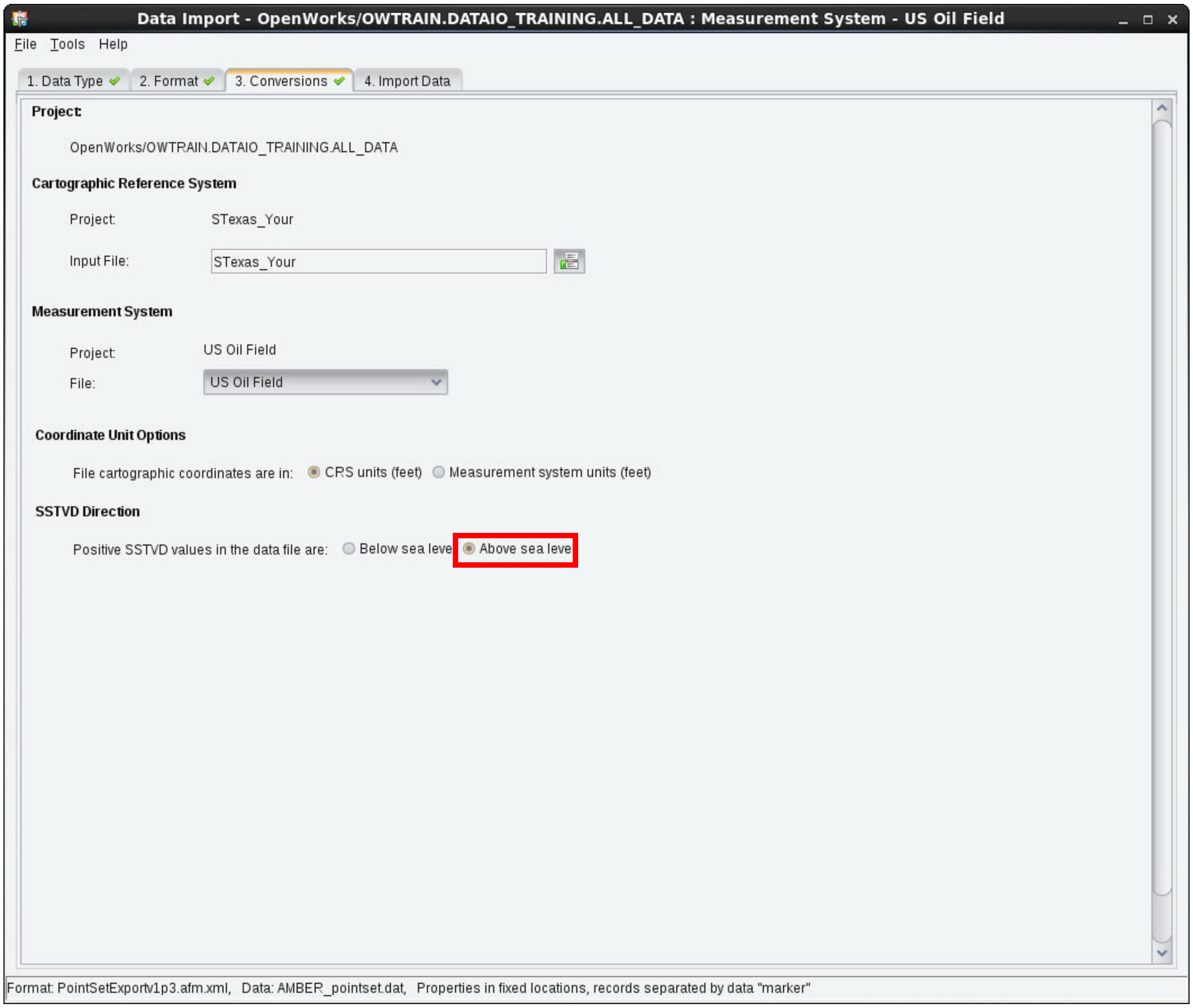
- Click **Continue** to finalize the selections made in this tab window and to proceed to the next step.



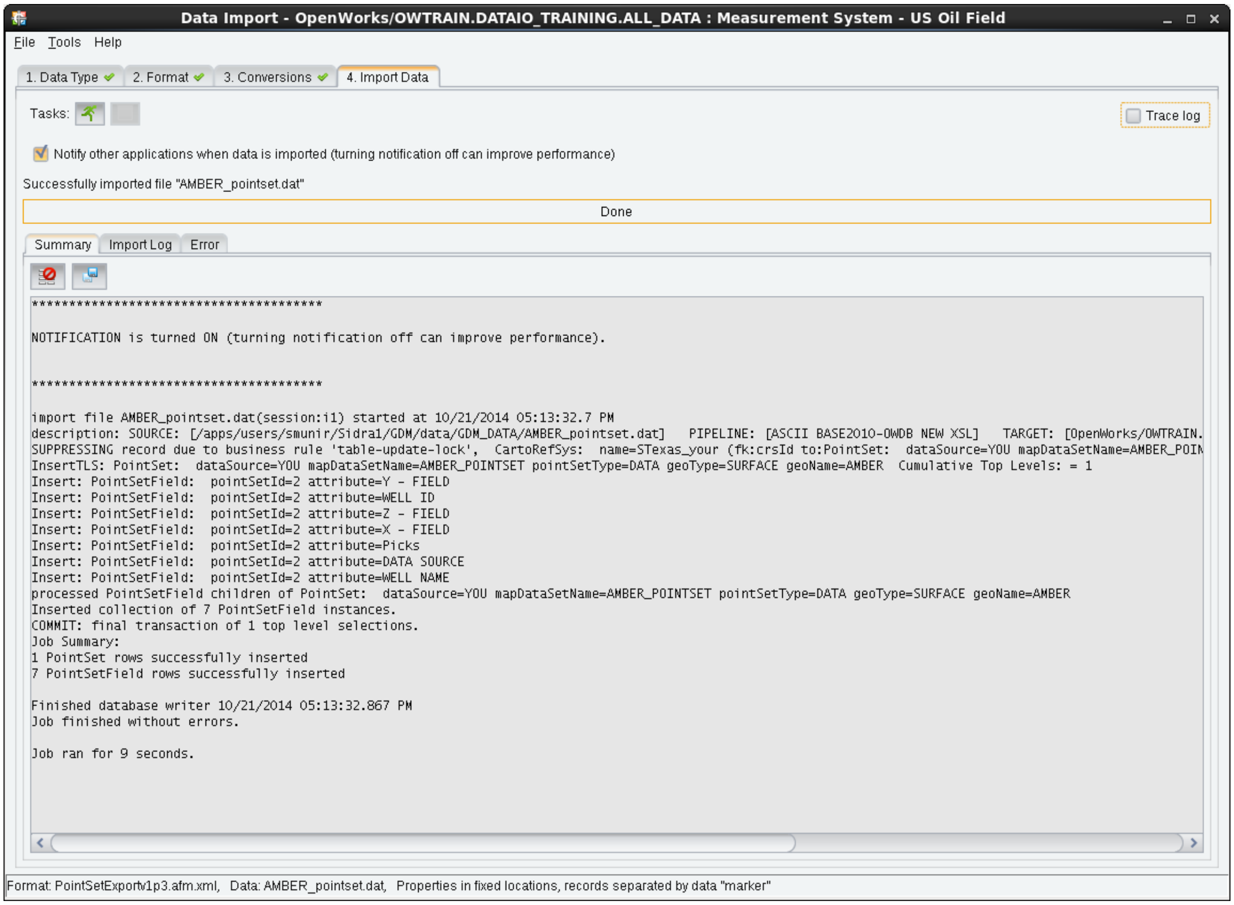
In the Format tab window, you can see the data item definitions of the Landmark format file in the Defined Data Items box; in the lower pane, you can see the highlighted fields of the input data file that will be imported.



3. Select the **Conversions** tab. Accept the **default values** for the input file CRS, the Coordinate Unit Options and the Measurement System. Change the **SSTVD Direction** to **Positive values: Above sea level.**



4. Select the **Import Data** tab and click the **Run import job**  icon.



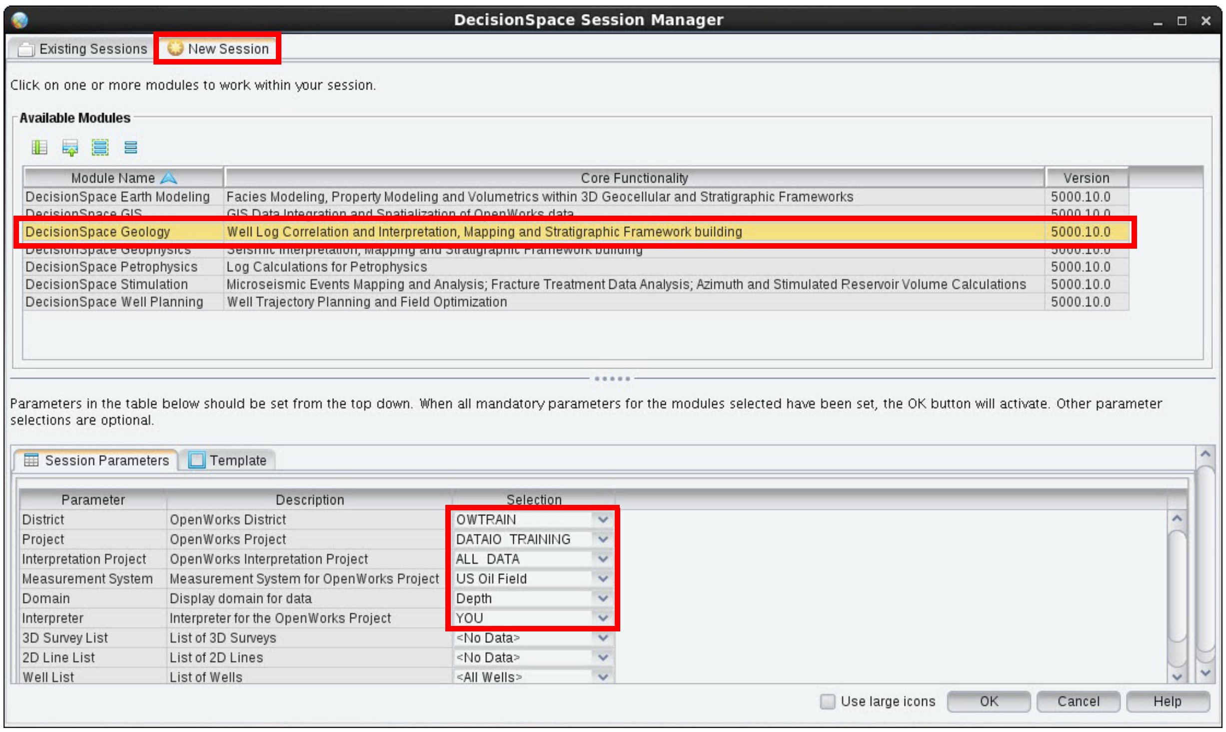
View the information in the Summary, Import Log, and Error tab windows. The Error tab window should display “Job finished without errors”. The Summary tab window states the number of point set rows and point set fields imported into the database.

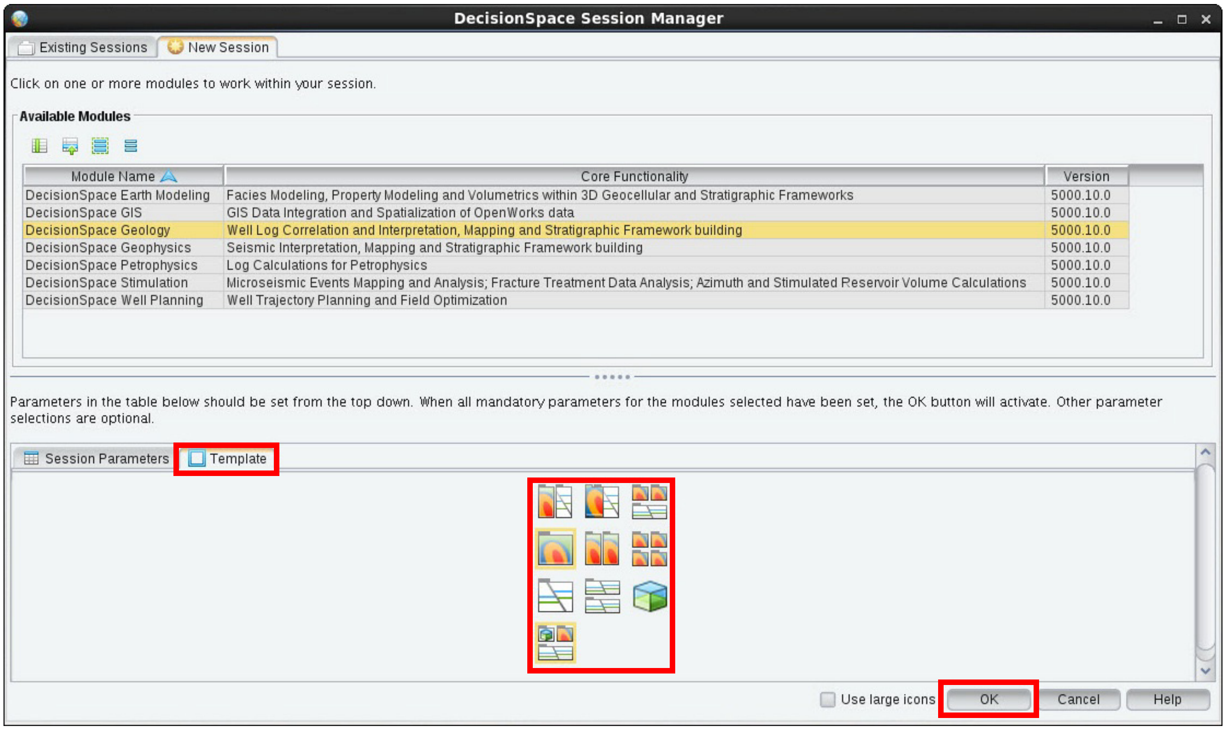
5. Select **File > Exit** to close the Data Import tool.

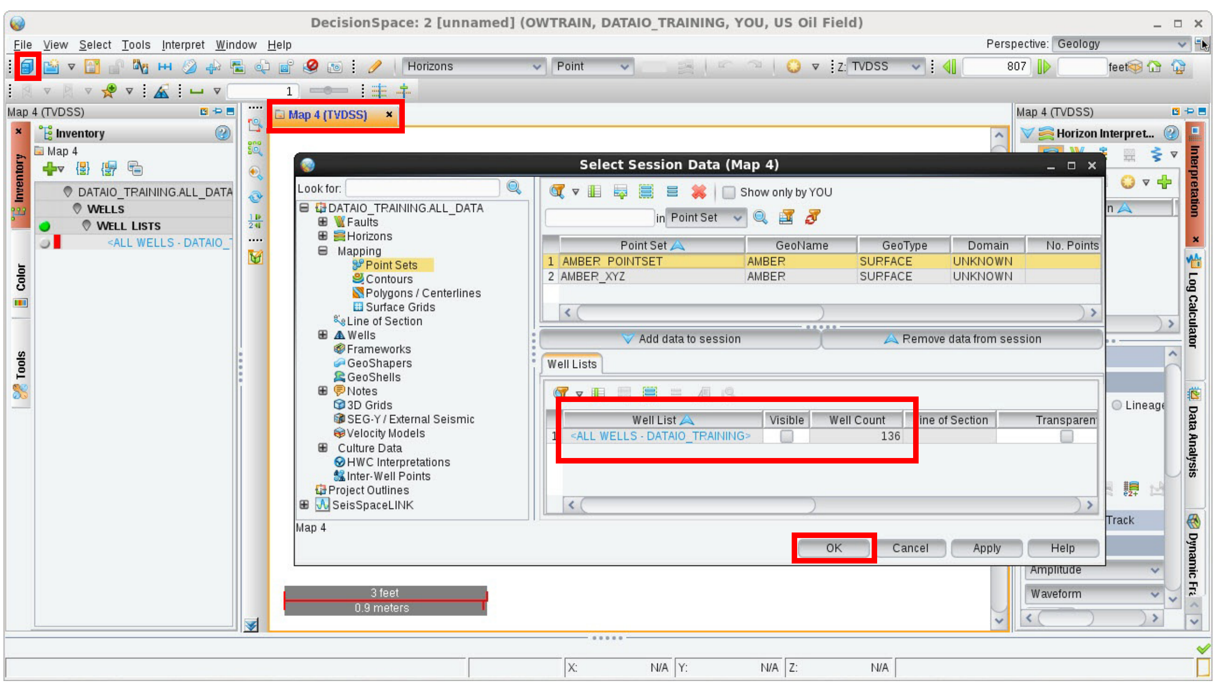
Exercise 9-5: Verifying the Point Set Import with DecisionSpace Geosciences Software

You can view, grid, and contour the imported point set with Landmark's DecisionSpace Geosciences to verify the imported data.

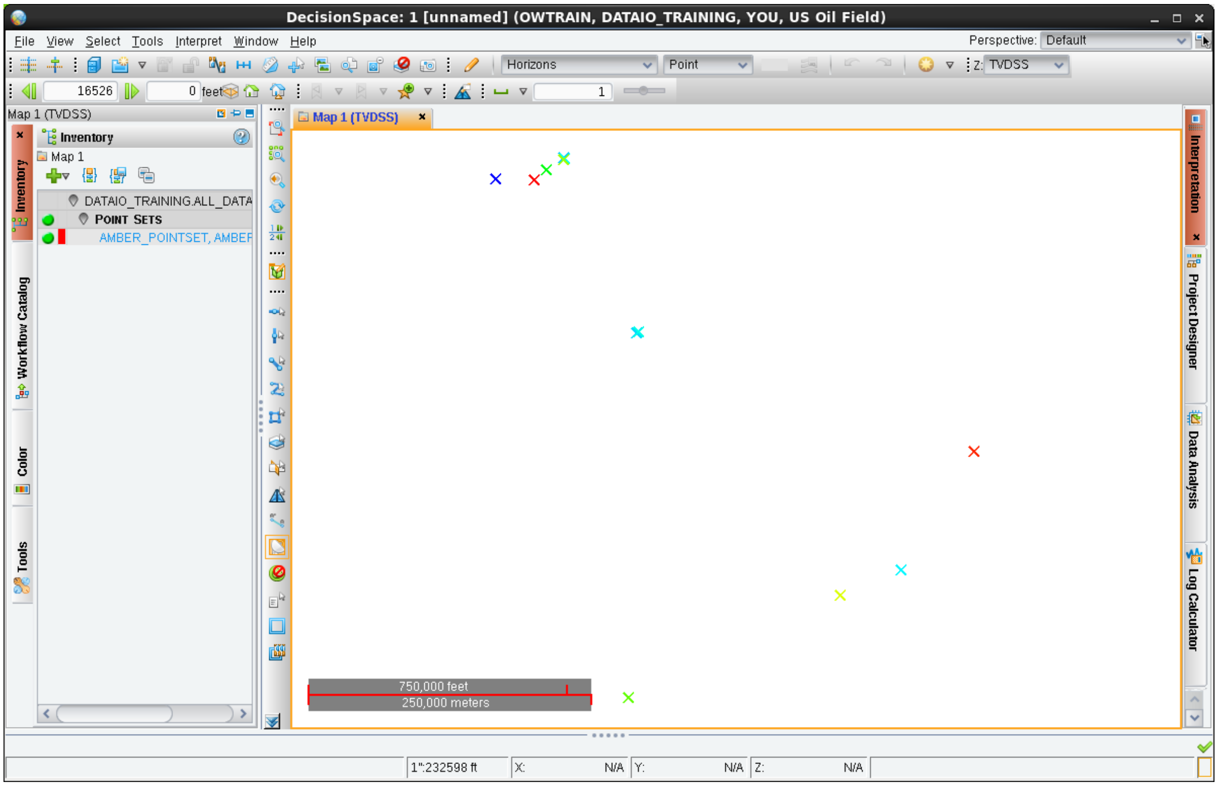
1. Select **Applications** > **DSGeosciences** from the OpenWorks command menu. Make the selections shown in the images below.



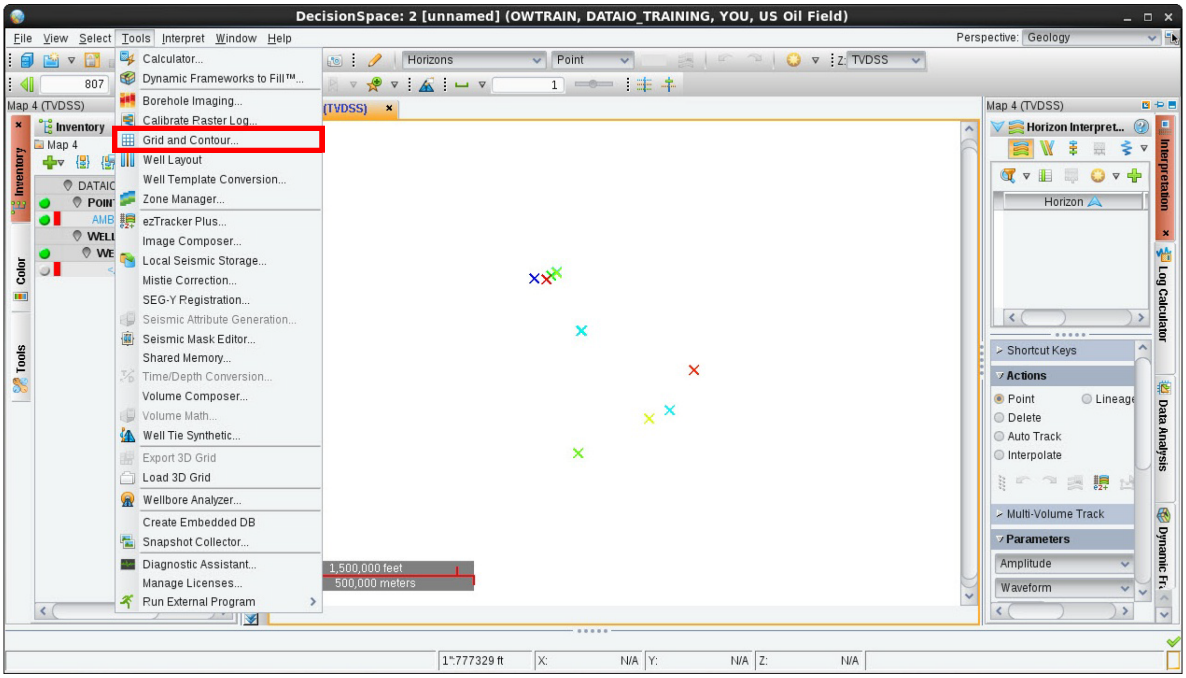

DecisionSpace Session Manager
Existing Sessions
New Session
Click on one or more modules to work within your session.
Available Modules
Module Name
Core Functionality
Version
DecisionSpace Earth Modeling
Facies Modeling, Property Modeling and Volumetrics within 3D Geocellular and Stratigraphic Frameworks
DecisionSpace GIS
GIS Data Integration and Spatialization of OpenWorks data
DecisionSpace Geology
Well Log Correlation and Interpretation, Mapping and Stratigraphic Framework building
DecisionSpace Geophysics
Seismic Interpretation, Mapping and Stratigraphic Framework building
DecisionSpace Petrophysics
Log Calculations for Petrophysics
DecisionSpace Stimulation
Microseismic Events Mapping and Analysis; Fracture Treatment Data Analysis; Azimuth and Stimulated Reservoir Volume Calculations
DecisionSpace Well Planning
Well Trajectory Planning and Field Optimization
5000.10.0
Parameters in the table below should be set from the top down. When all mandatory parameters for the modules selected have been set, the OK button will activate. Other parameter selections are optional.
Session Parameters
Template
Use large icons
OK
Cancel
Help


DecisionSpace: 2 [unnamed] (OWTRAIN, DATAIO_TRAINING, YOU, US Oil Field)
File View Select Tools Interpret Window Help
Perspective: Geology
Map 4 (TVDSS)
Inventory
Select Session Data (Map 4)
Look for:
DATAIO_TRAINING.ALL_DATA
Faults
Horizons
Mapping
Point Sets
Contours
Polygons / Centerlines
Surface Grids
Line of Section
Wells
Frameworks
GeoShapers
GeoShells
Notes
3D Grids
SEG-Y / External Seismic
Velocity Models
Culture Data
HWC Interpretations
Inter-Well Points
Project Outlines
SeisSpaceLINK
Show only by YOU
Point Set
GeoName
GeoType
Domain
No. Points
AMBER_POINTSET
AMBER
SURFACE
UNKNOWN
AMBER_XYZ
Add data to session
Remove data from session
Well Lists
Well List
Visible
Well Count
Line of Section
Transparen
<ALL WELLS - DATAIO_TRAINING>
136
OK
Cancel
Apply
Help

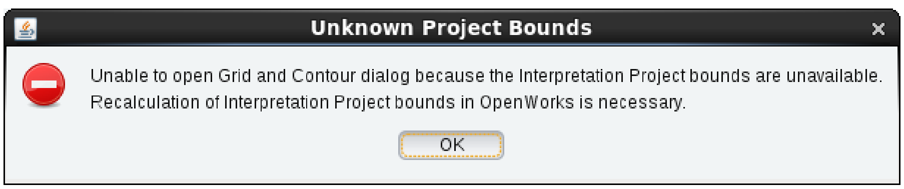
2. Click **OK**. You will see the data points displayed in the graphic area of the DecisionSpace Map view.



3. Click **Tools** on the horizontal toolbar to open a drop-down menu, then select **Grid and Contour** to create a grid and a contour using the imported point set.



4. Grid and Contour creation will fail with the following error.



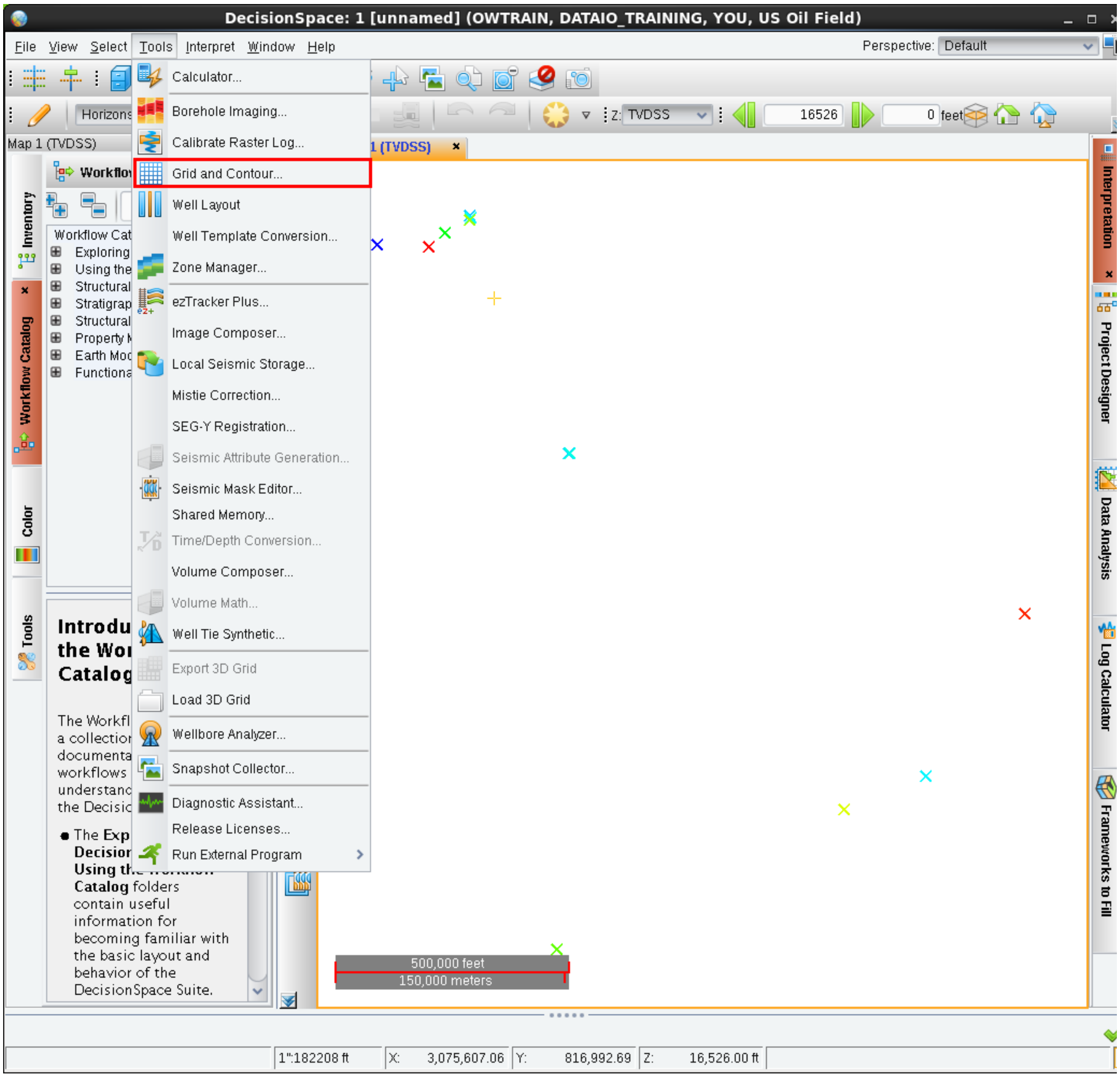
The error is related to undefined Area of Interest in the project. The Interpretation Project Bounds needs to be recalculated in Openworks.

5. Minimize DecisionSpace Geosciences. Select P**roject > Project Administration** utility from the OpenWorks command menu. Select the project **DATAIO_TRAINING**, then click **Modify**.

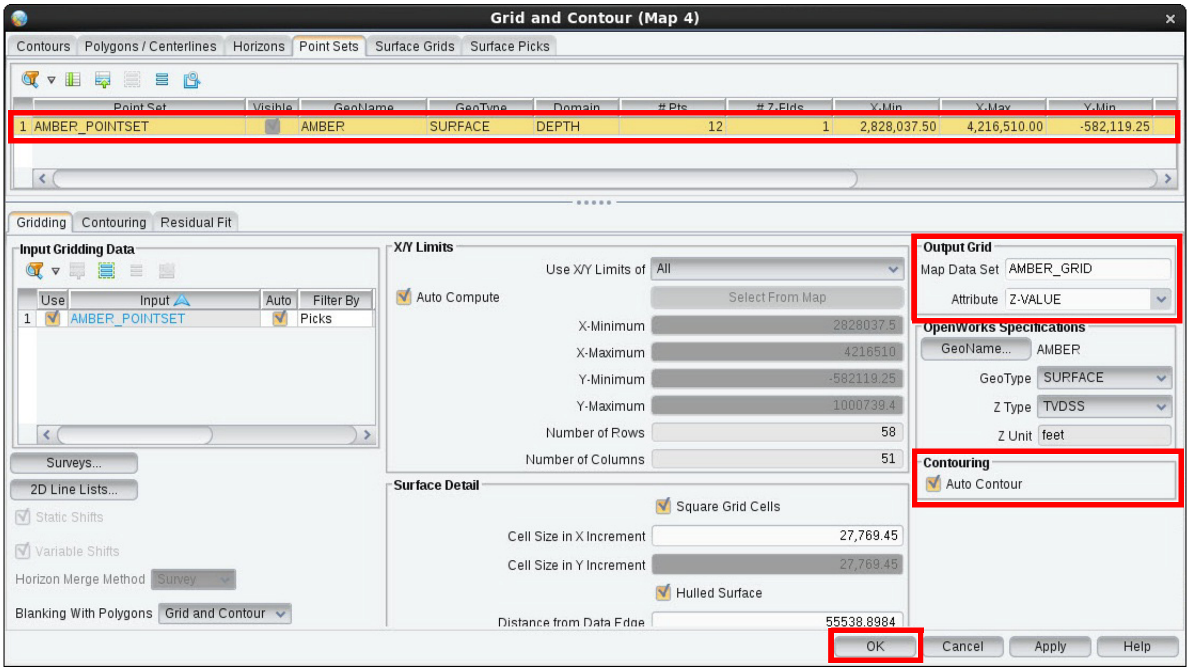
6. In the **Area of Interest** tab, click **Compute From Data** and then click **OK**.

7. Once the process is finished, click **Close**.

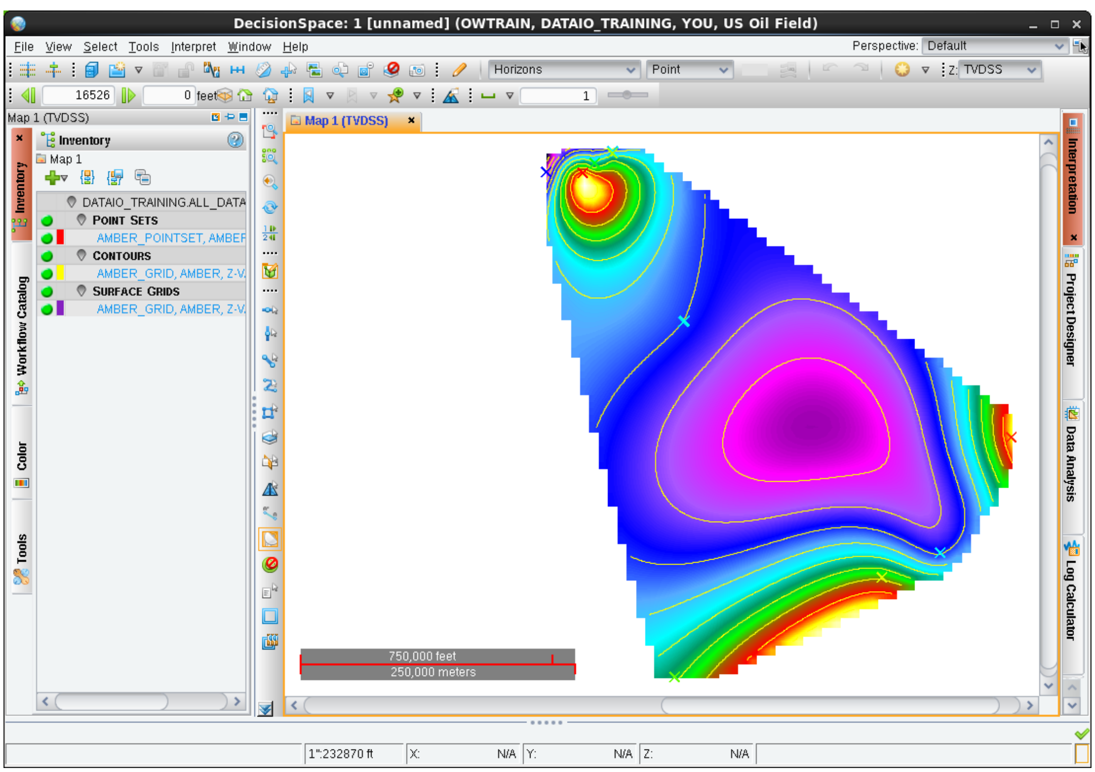
8. Go back to DecisionSpace Geosciences and select **Tools > Grid and Contour** to create a grid and a contour using the imported point set.



9. Select the options you see in the window shown here.



10. Click **OK**. The Map view displays the contours generated from AMBER_GRID.



11. Select **File > Exit** to quit DecisionSpace Geosciences.

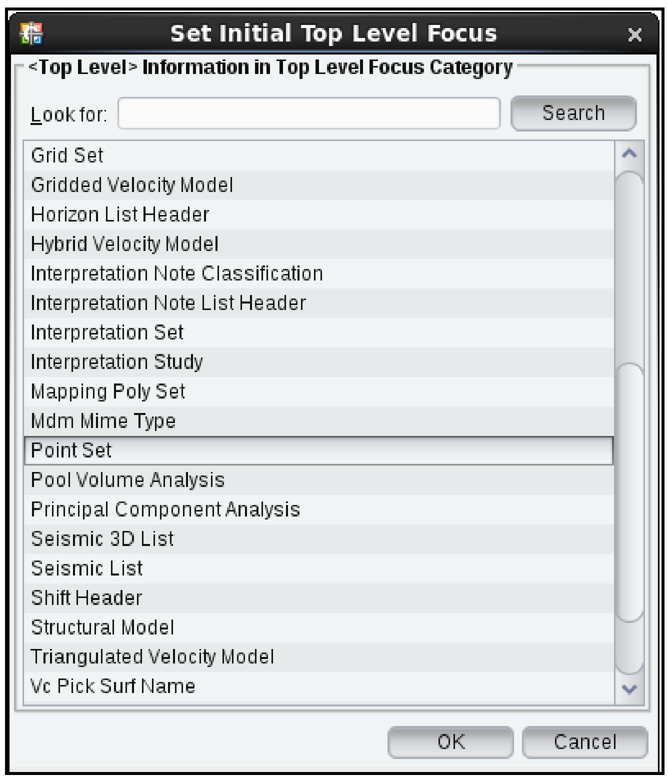
Interpretation Data Manager

Interpretation Data Manager provides an easy way to view and delete interpretation-related data stored in the OpenWorks database, such as grids, point sets, fault polygon sets.

Exercise 9-6: Viewing a Point Set Using Interpretation Data Manager

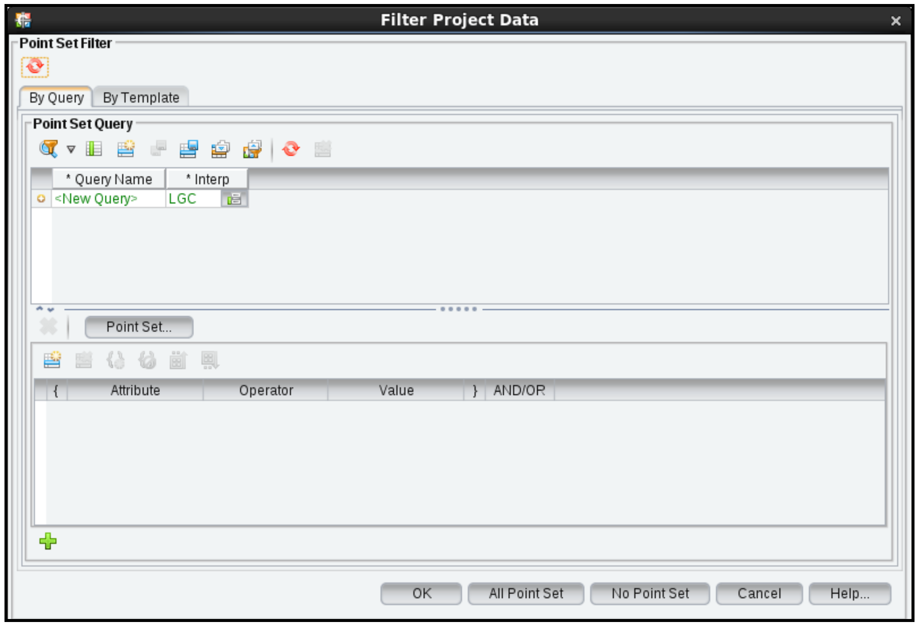
1. To open **Interpretation Data Manager** from the OpenWorks command menu, select **Data > Management > Interpretation Data Manager**.

2. The Set Initial Top Level Focus dialog box lists data types in the project that you can view/delete/export. Select **Point Set** as the Top Level Focus Category, and then click **OK**.

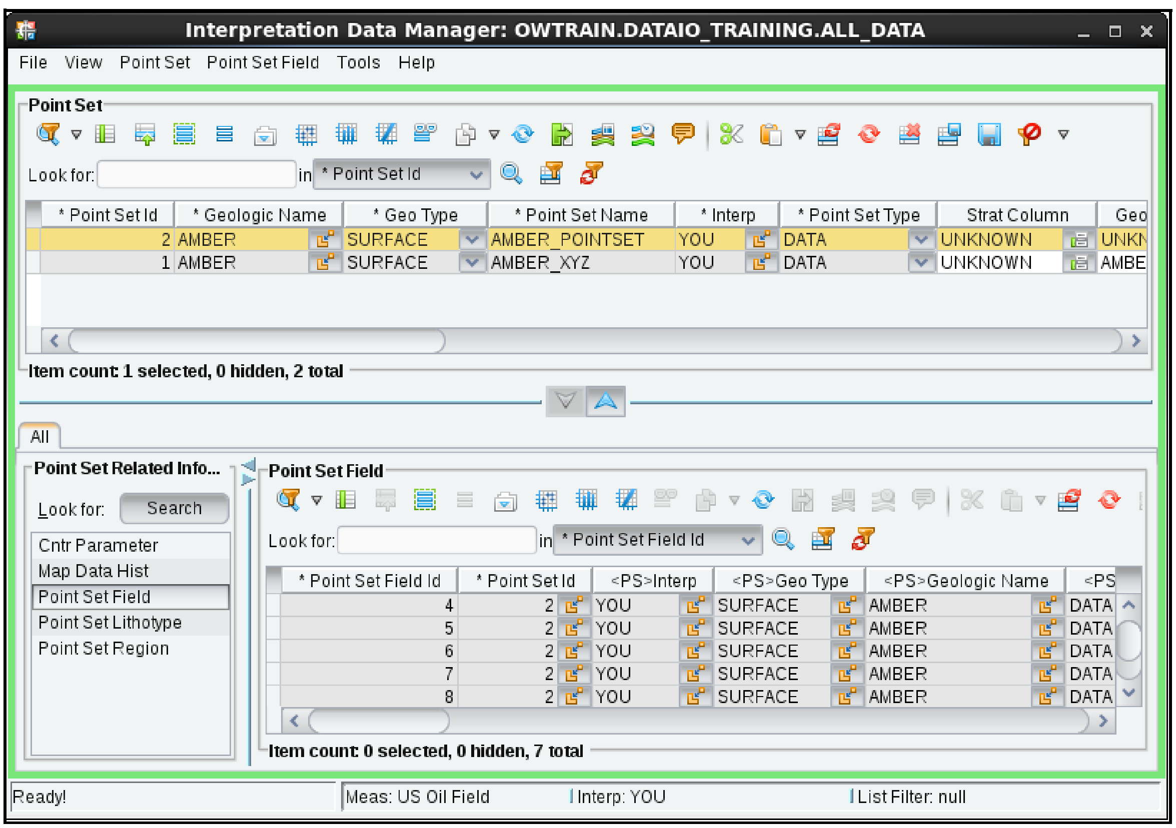


The Filter Project Data dialog box allows all point sets to be viewed or allows selection criteria to be set, either by query or template, to limit the point sets to only those that meet the criteria.

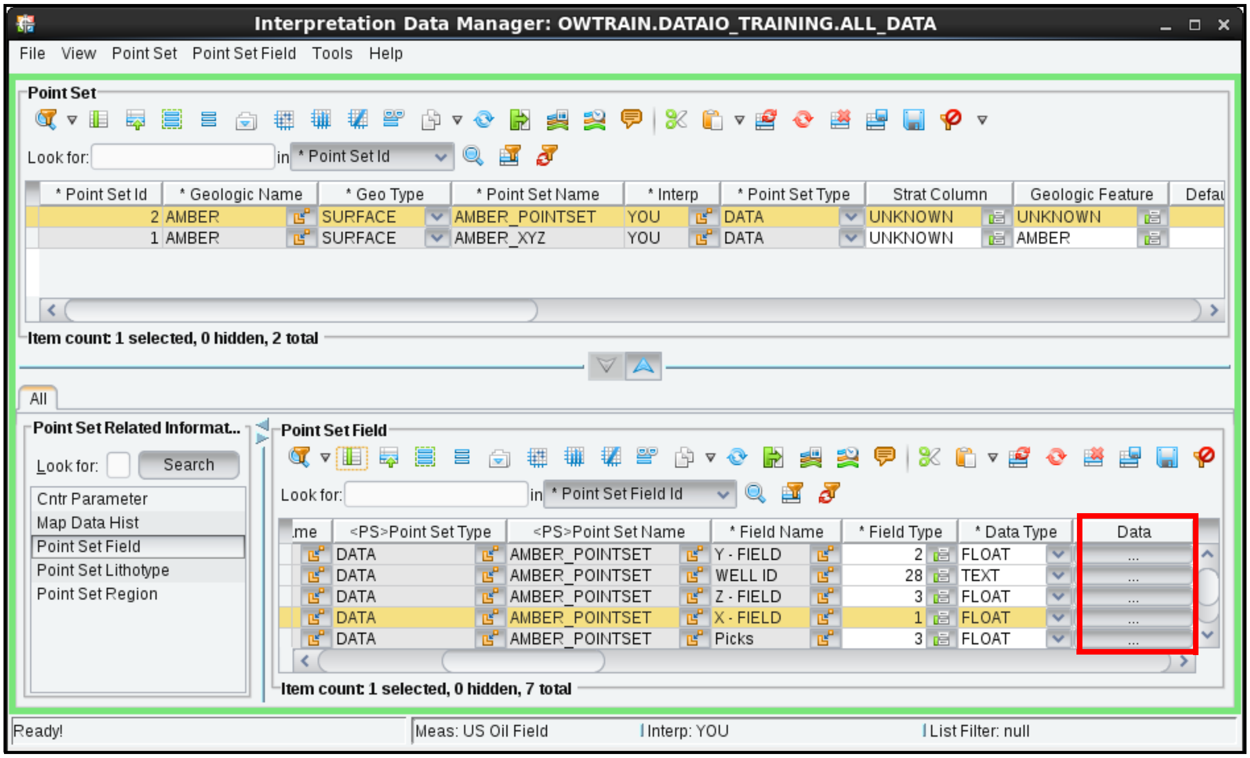
3. For this exercise, select **All Point Set** to view all the point sets in the project.

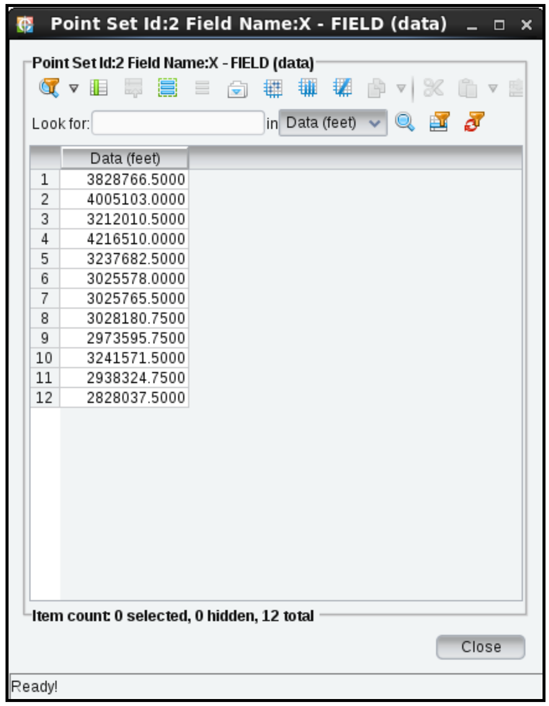


4. Highlight **AMBER_POINTSET** and select **Point Set Field** from the Point Set Related Information list to show more information about your selection.



5. To see real values of one of the data fields displayed, scroll to the far right and click the data values field (**...**).





Data results

To export data (either the point set itself or specific values from the Point Set Related Information) to various ASCII file formats, select the desired data and click the **Export to various file formats**  icon. Click **Close** when you are finished viewing the data.

6. Select **File > Close** to exit the *Interpretation Data Manager.*

Project Data Transfer

Project Data Transfer (PDT) provides a quick method for transferring data from one Project Database to another. It is typically used to:

- Combine data from several OpenWorks projects into regional projects.
- Transfer data from one Project database on one Oracle instance to another project database in a different Oracle instance.

The source project and target project can use different cartographic reference systems (CRS) and different units of measure. Project Data Transfer will automatically convert the incoming data to the CRS and units of the target project.

Types of Data Transferred

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 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

Access Levels Required

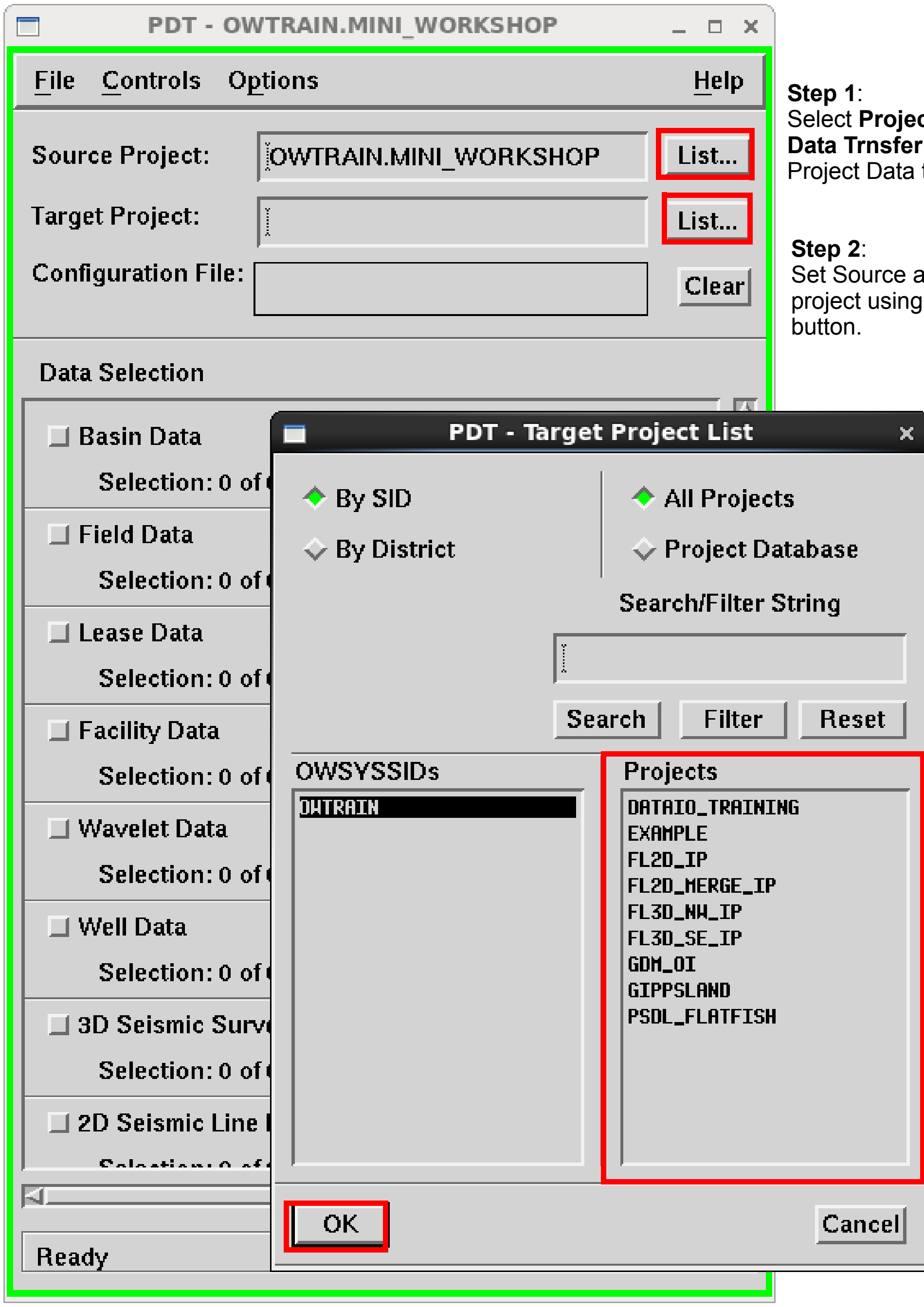
To be able to transfer data from one OpenWorks project to another, you must be logged on as an OpenWorks user and must have the following access permissions to both projects:

- At least **Browse** access for the source project
- Either **Manage** or **Interpret** access to the target OpenWorks project

Notes

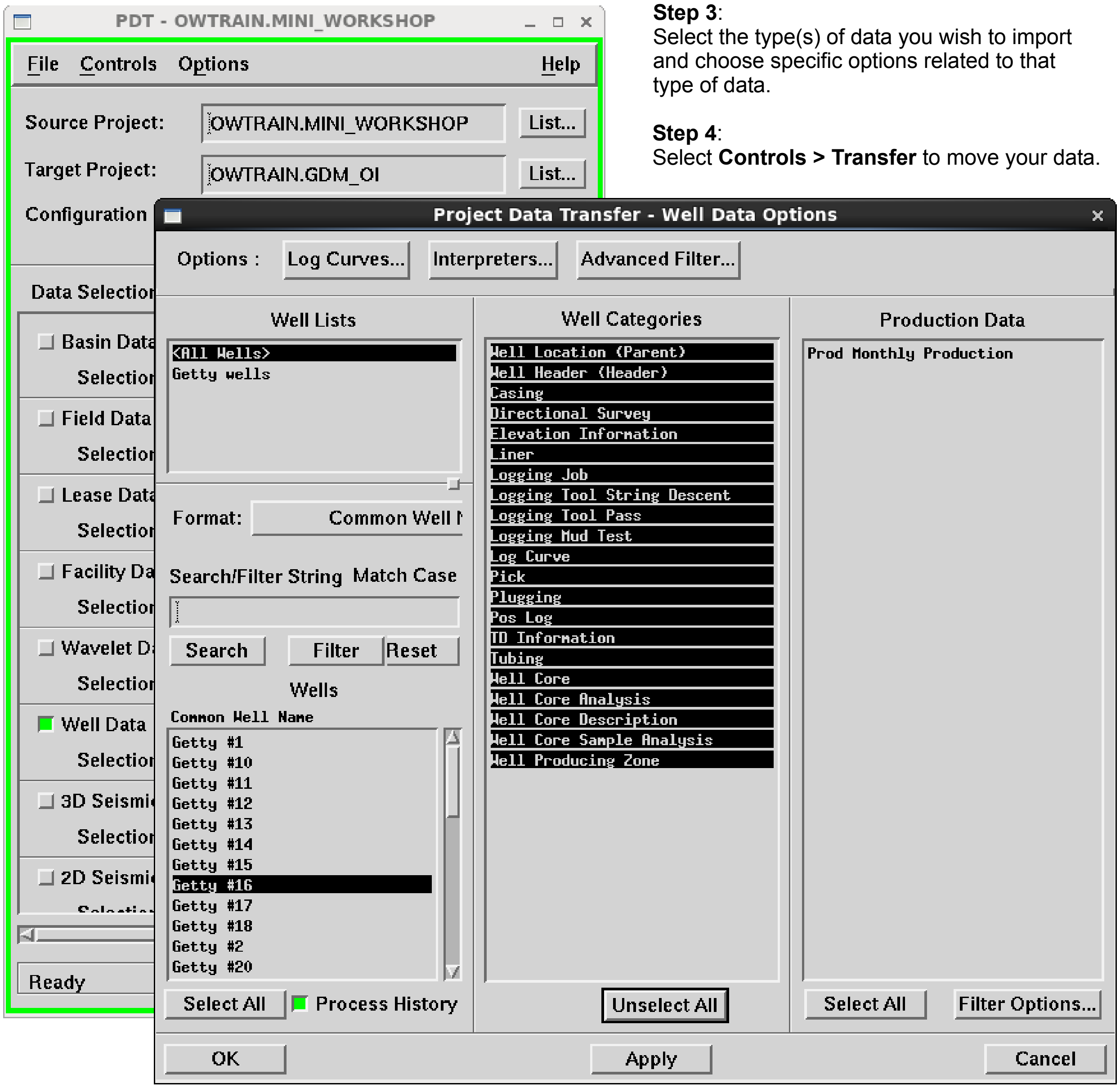
- If either the source project or target project has a standalone CRS, it is impossible to accurately project the *x,y* coordinates into the target project. PDT will not stop you from attempting such a transfer, but the coordinates will be meaningless. If you select a source or target that is self-referencing, PDT will give you the option of choosing another project or continuing without any cartographic conversions.
- 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.

PDT Procedure



Step 1:
Select **Project > Project Data Trnsfer** to open the Project Data transfer utility.

Step 2:
Set Source and Target project using the **List** button.



Step 3:
Select the type(s) of data you wish to import and choose specific options related to that type of data.

Step 4:
Select **Controls > Transfer** to move your data.

Exercise 9-7: Project Data Transfer

In this exercise, you move some of the remaining data from the MINI_WORKSHOP project to the GDM_OI project.

1. Select **Project > Project Data Transfer** to open the Project Data Transfer utility.

2. Select **MINI_WORKSHOP** as your Source Project and **GDM_OI** as your Target Project.

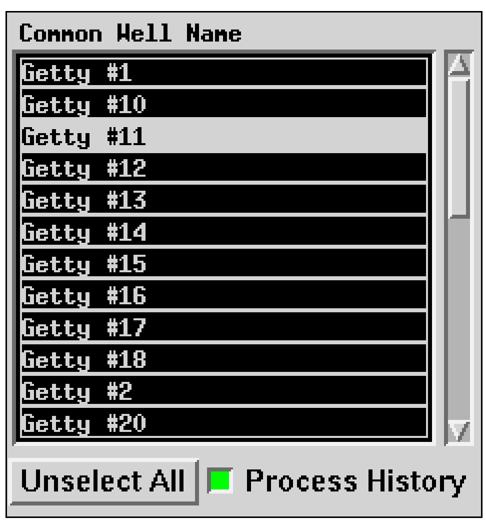
3. Toggle ON **Well Data** from the Data Selection list and choose **Options**. The Project Data Transfer - Well Data Options dialog box displays.

> **Note**
>
> PDT checks the areal extents of both projects and posts a message in the dialog box indicating if projects overlap, do not overlap, or that the source project extends beyond the target project.
>
> You can proceed with the data transfer in any case but you may need to adjust the areal extent of the target project later, using the Project Modify utility.

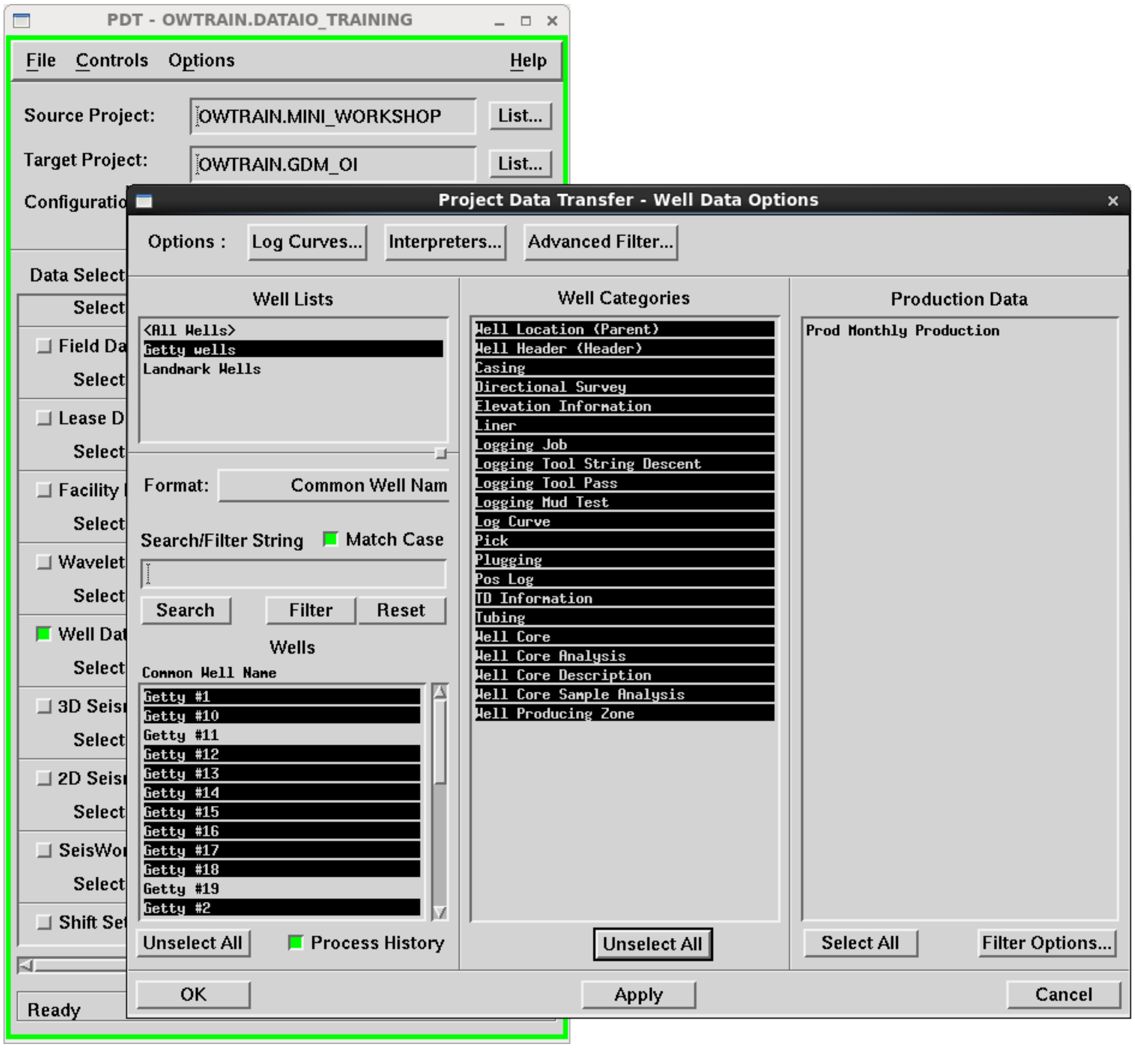
4. Select the **Getty Wells** well list.

5. Click **Select All** to select all the Getty wells. Recall that you previously loaded data for well Getty #11 and well Getty #19.

6. Hold down the **Control** key while deselecting **Getty #11** and **Getty#19**.



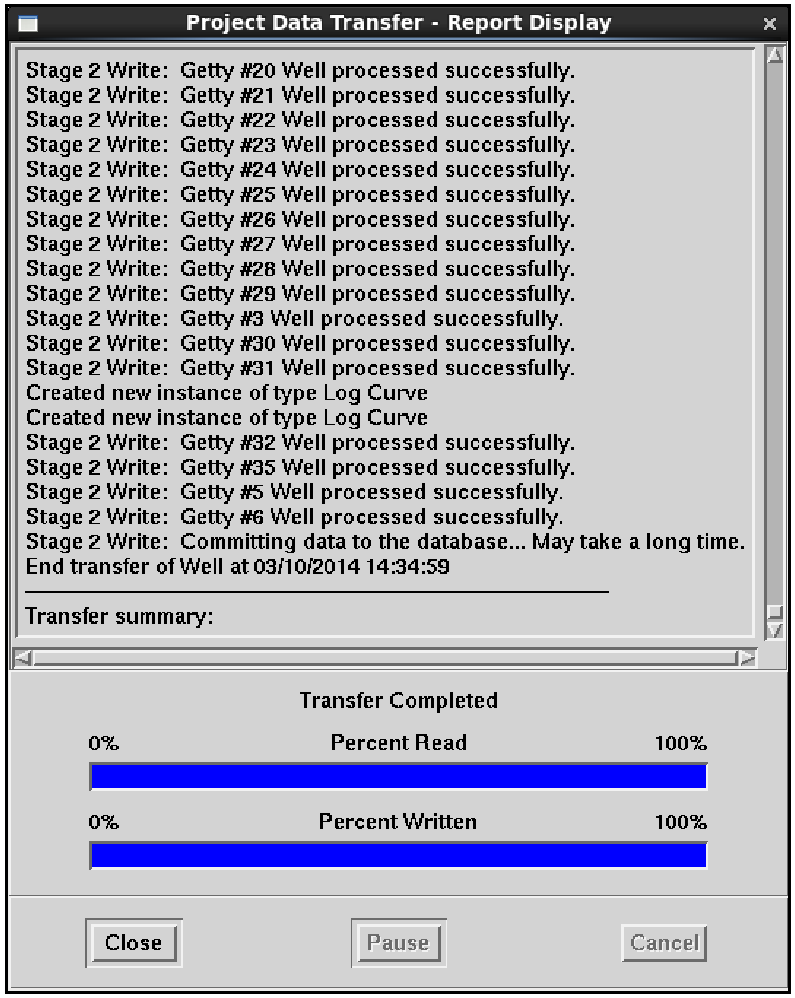
7. Click **Select All** to choose all of the Well Categories for transfer.



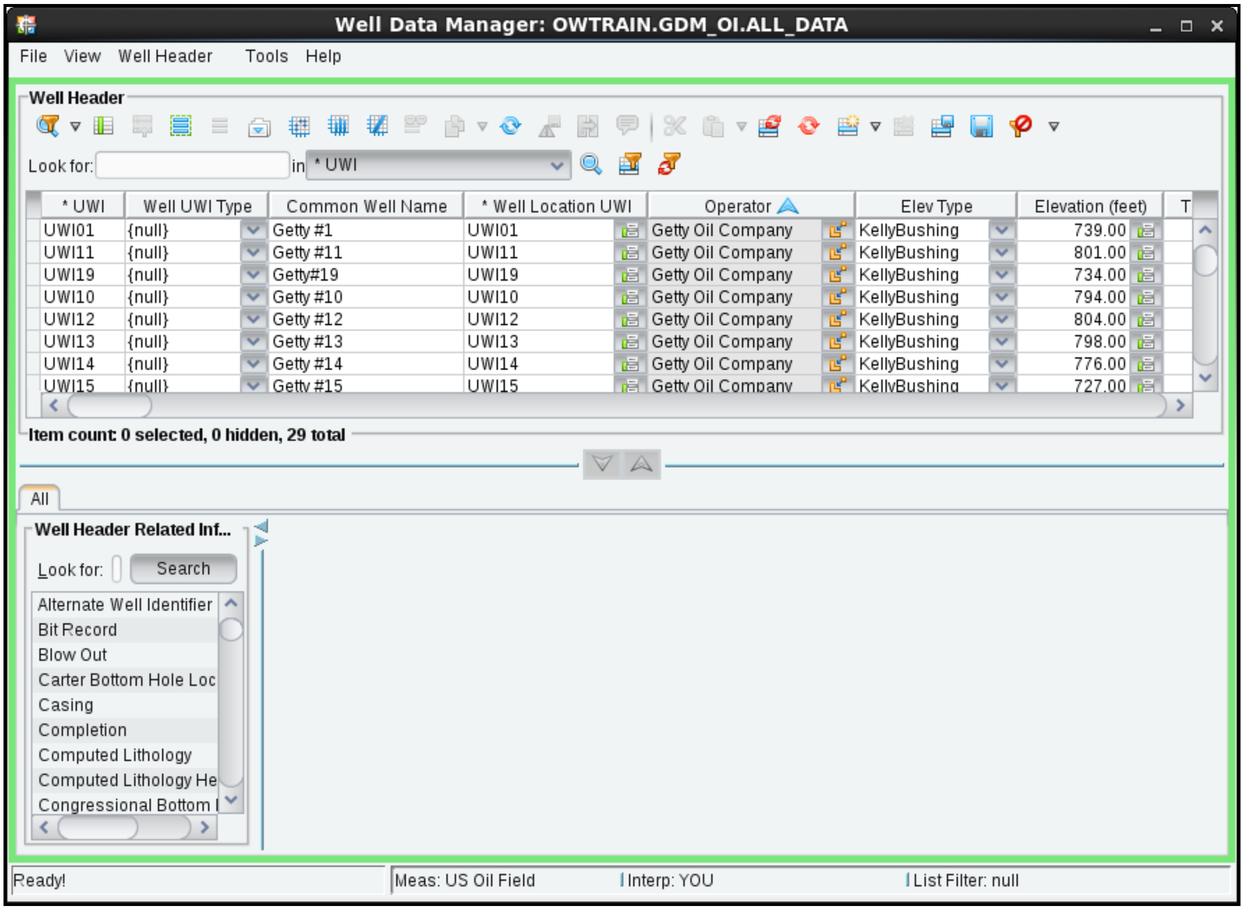
8. Click **OK** in the Project Data Transfer - Well Data Options dialog box.

9. Select **Controls > Transfer** to transfer the well data. Click **OK** in the Transfer Summary window.

10. When the Project Data Transfer is complete, click **Close**.



11. To view the results of your transfer, open the Well Data Manager. All of the Getty wells now display in the well list.

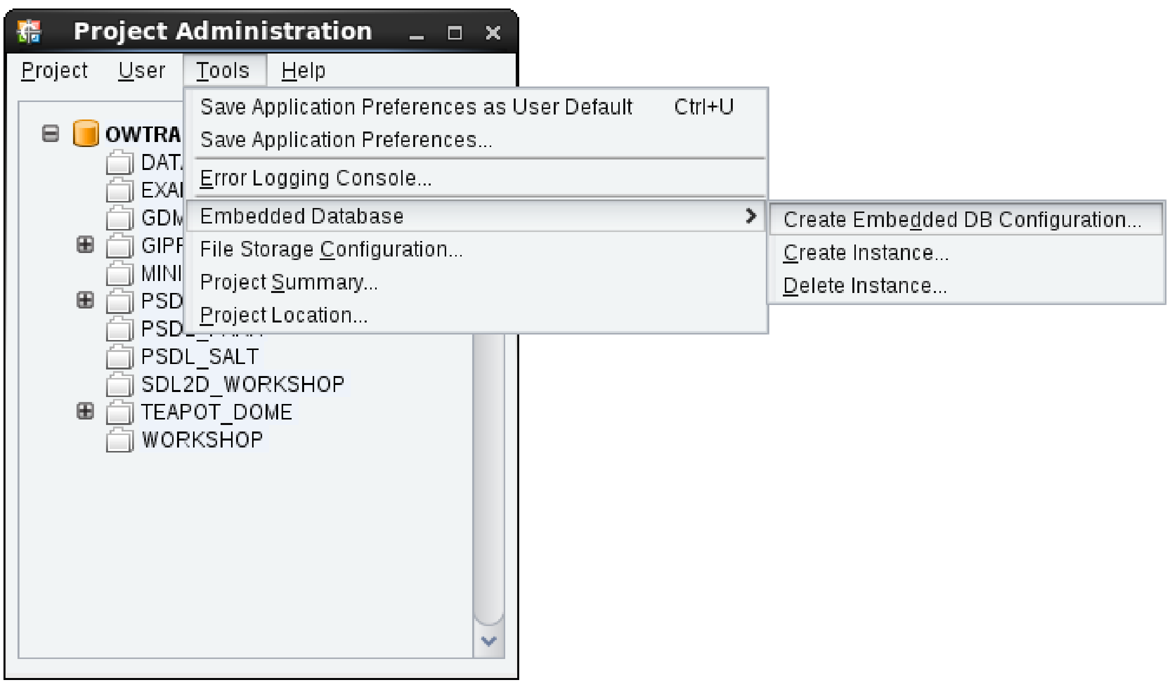


12. Exit Well Data Manager and Project Data Transfer.

Create an Embedded Database

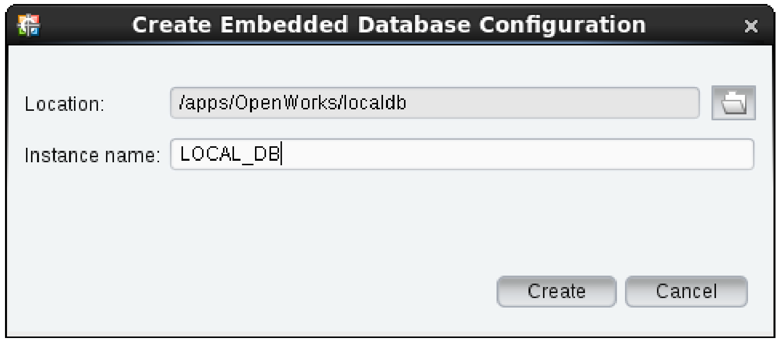
The embedded database is an alternative database platform with SQLite. You can administer projects and data in an embedded database with the same tools that you are familiar with using an OpenWorks Oracle database instance. Additionally, the embedded database allows you to have a project standalone, disconnected from any other computer or network, that only you have access to.

The embedded database will be the local repository for your data. To create a new embedded database, select **Tools > Embedded Database > Create Embedded DB Configuration** from the **Project Administration** dialog box, as shown below:

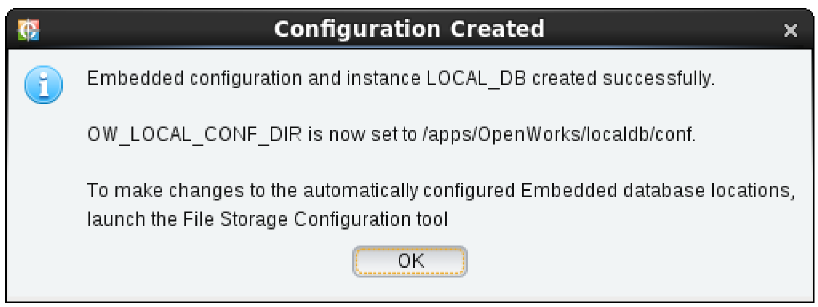


Then select a Location on the local machine where the data will be stored. For best results, this should be an empty folder with a large amount of free space. Enter the **Location** and the name for the new local SID or **Instance Name** and then press the **Create** button.

> **Note**
>
> By default, the OpenWorks installation process creates an embedded database named **EMBEDDED_OW**. In this chapter, we will be creating another database for exercises.



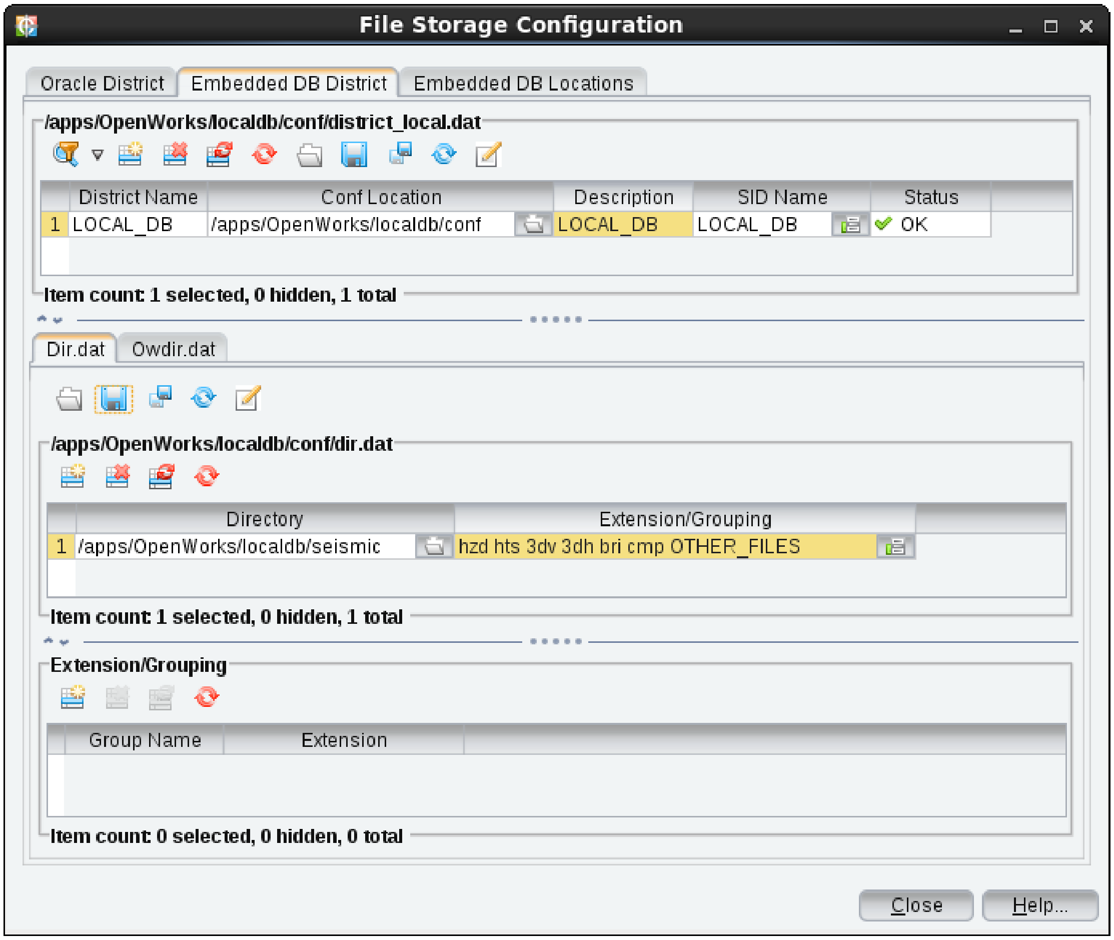
Once the embedded database is created the OW_LOCAL_CONF_DIR is set to the directory or location configured here. The embedded database can be administered using the File Storage Configuration tool, which can be accessed from **Project Administration > Tools > File Storage Configuration**.



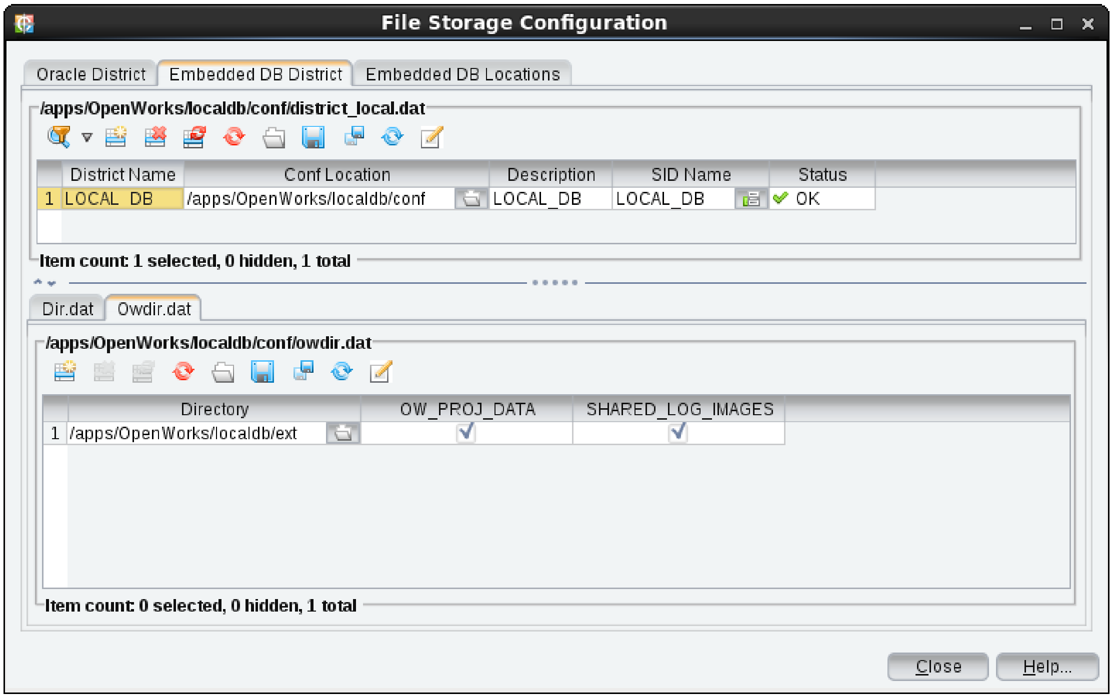
File Storage Configuration (or OpenWorks Configuration) allows you to configure parts of the OpenWorks environment and to determine where the data files are stored locally for a district. It allows you to create and edit the OpenWorks configuration files in the embedded database: district.dat, owdir.dat, and dir.dat. The dialog box has three tabs:

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

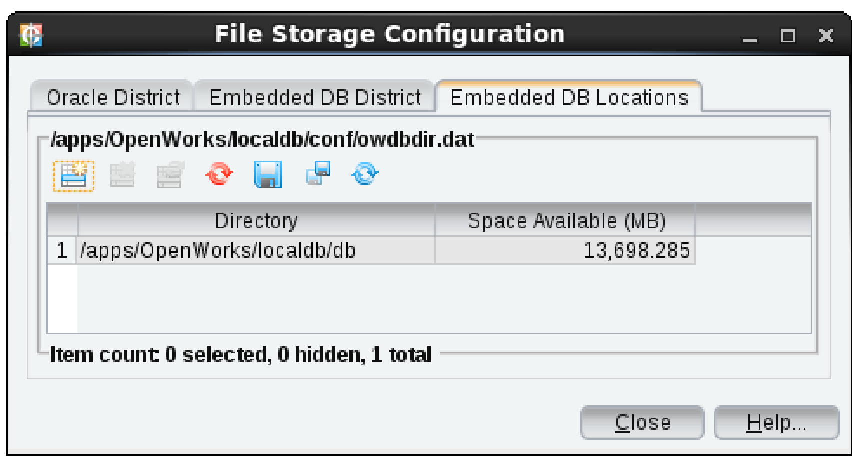
If you want all Local SIDs to share the same Well Data, you can give them the same Conf Location values.



If your well data is on a server and you need to access it disconnected from the network, you will need create your Conf Location and configure these files to see the data locally.



For The embedded DB Locations, you can define new or utilize already defined locations.



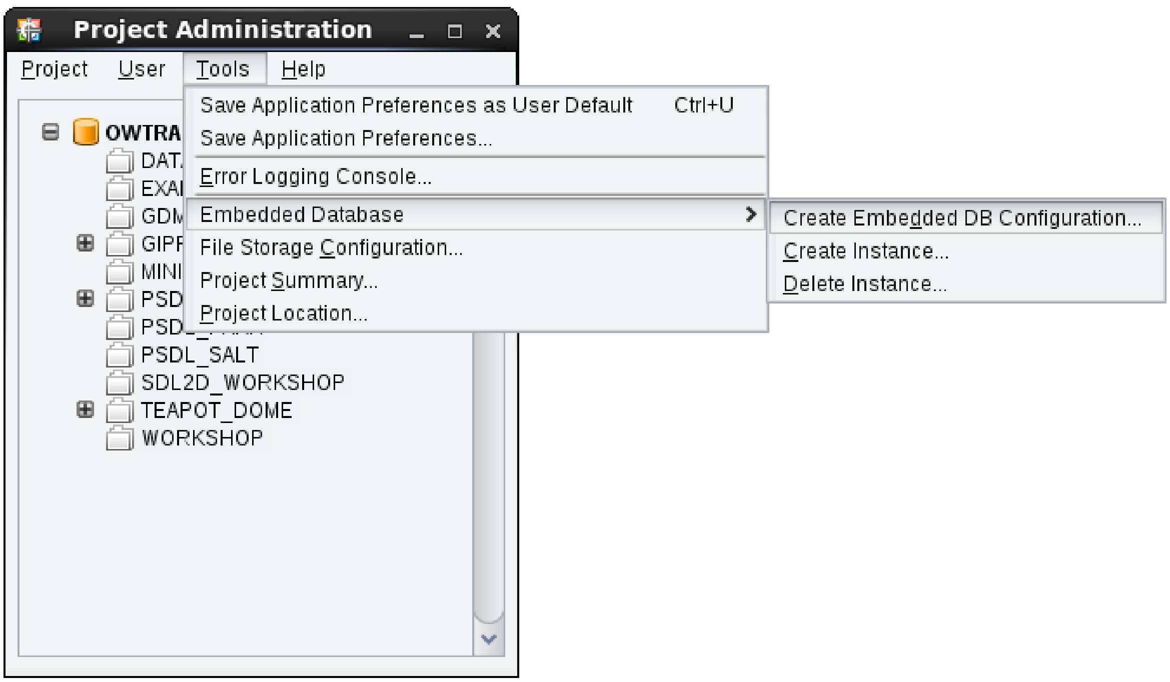
Exercise 9-8: Create a Local Embedded Database with SQLite.

1. Make sure you have set up your environment in OpenWorks 5000.10.1 or higher to connect to Oracle.

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

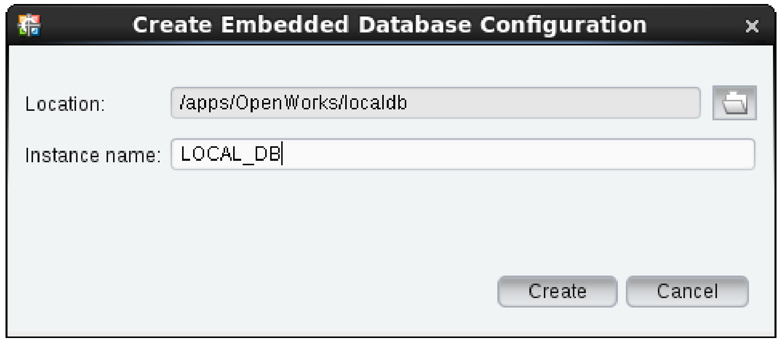
3. Start **Project Administration** from the OpenWorks command menu, by selecting **Project > Project Administration**. The Project Administration window displays.

4. Select **Tools > Embedded Database > Create Embedded DB Configuration**, as shown below:

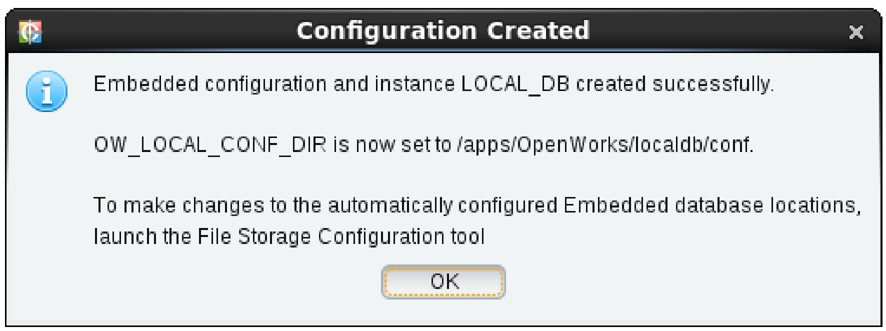


5. Select a **Location** on the local machine. This is the area where local data will be stored. For best results, this should be an empty folder with a large amount of free space. Enter a name for the new local SID or **Instance Name** and press the **Create** button.

> **Note**
>
> By default, the OpenWorks installation process creates an embedded database named **EMBEDDED_OW**. In this chapter, we will be creating another database for exercises.



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**.



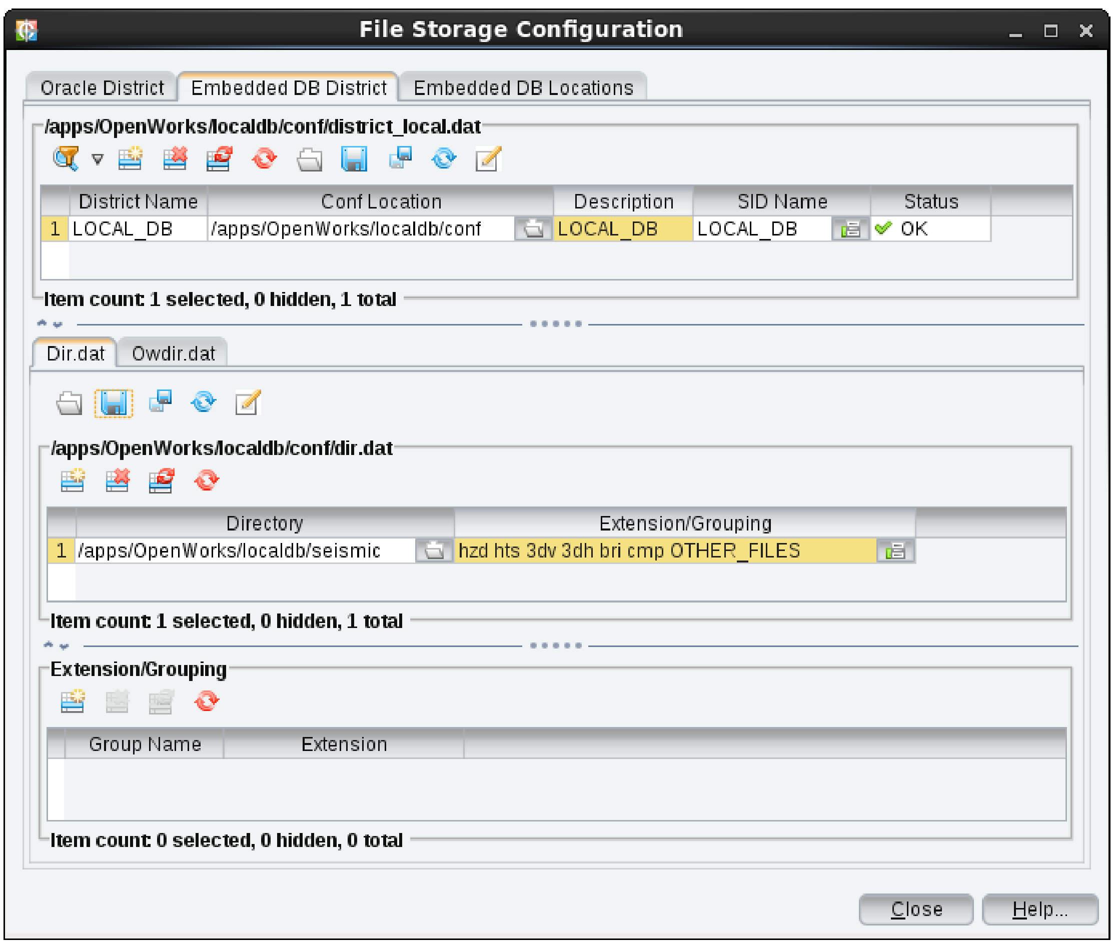
6. From the **File Storage Configuration** tool, add an entry for the name of the new district. Set the config location to the location where the system will keep your dir.dat and owdir.dat.

   If you want all Local SIDs to share the same Well Data, you can give them the same Conf Location values.

   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 and "OK" under the status column to verify that everything is configured properly.

   Be sure to save, and close the tool when finished.

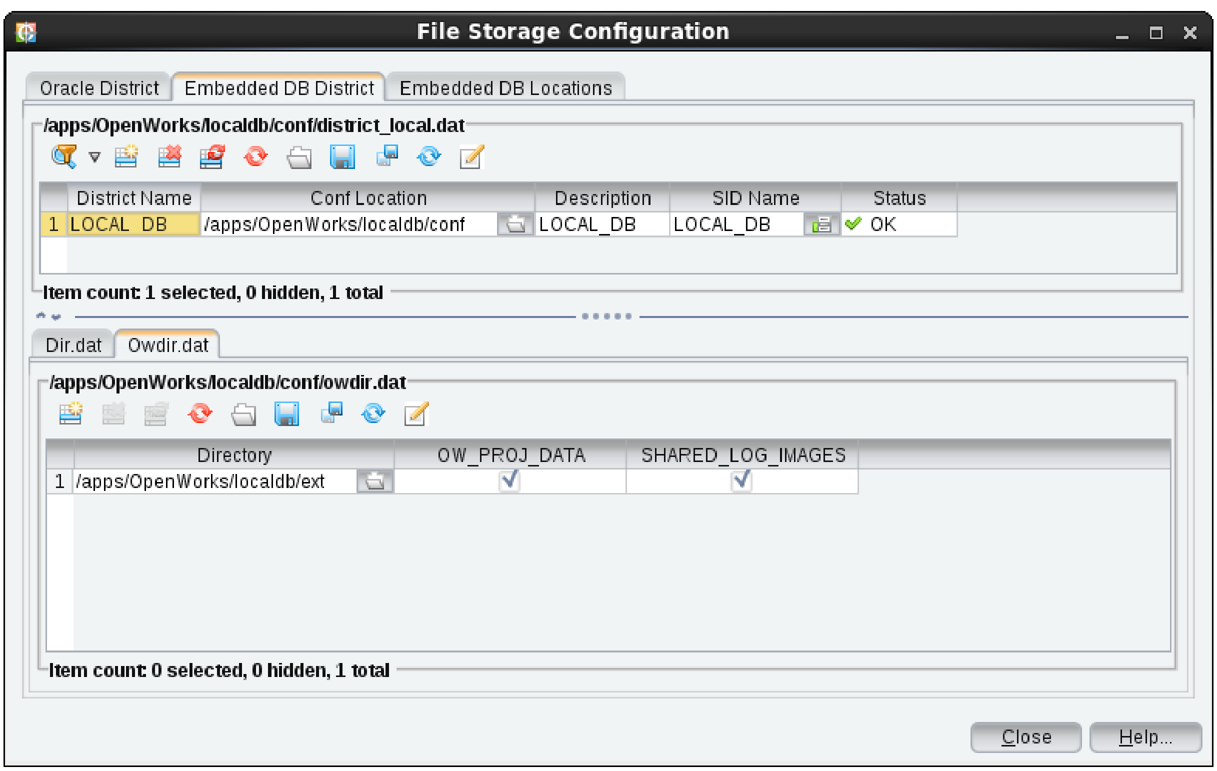


Embedded DB District Configuration

The configuration of an Embedded Database District is very similar to configuring an Oracle District:

- District name
- Location of the conf directory
- Description (optional)
- Name of the OpenWorks database instance where the OpenWorks projects are stored.
- Location of seismic and other files. This configuration includes the creation and configuration of dir.dat. This file is stored in the conf directory defined by a location on the Embedded DB Locations tab. For more information, see dir.dat Configuration File.
- Location of the project files (such as color files and log images). This configuration includes the creation and configuration of owdir.dat. This file is stored in the conf directory defined by a location on the Embedded DB Locations tab. For more information, see owdir.dat Configuration File.

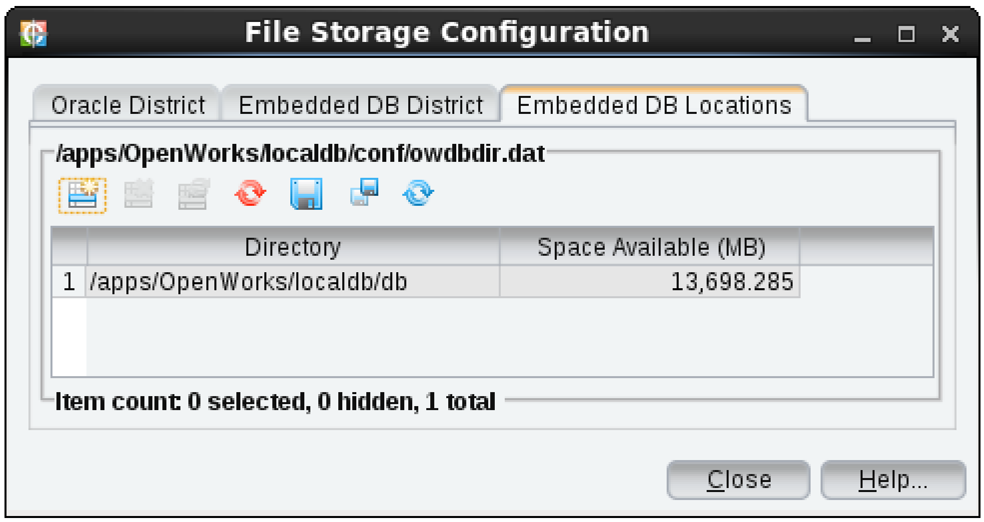
However, the location of the conf files is defined by a location listed on the Embedded DB Locations tab, and the district file is called district_local.dat instead of district.dat.



7. Select the **Embedded DB Locations** tab, it shows the instance and location of the embedded database created, also 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.

Embedded DB Locations Tab

When OpenWorks is installed, a default embedded database is created for the installation. The 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.

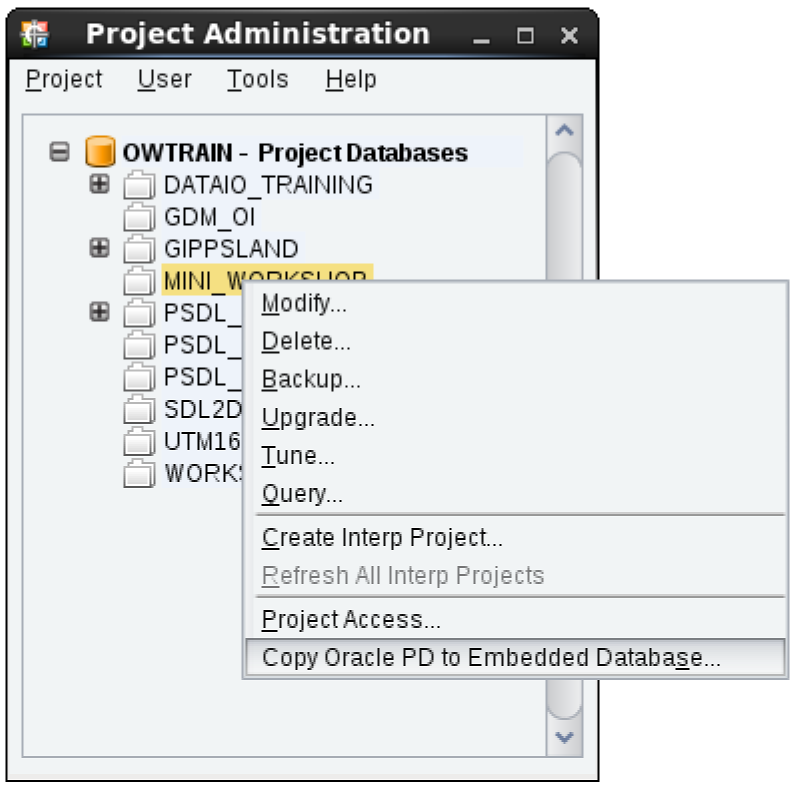


Once the local database LOCAL_DB has been created and configured, we are able to create a new project or copy an existing Oracle project to this local database.

Copying Oracle Projects Data to an Embedded Database

This procedure assumes OW_LOCAL_CONF_DIR is set, a local instance has been created, the district and database locations have been determined and the configuration files (like dir.dat and owdir.dat) have been created. It guides you through the process of copying an OpenWorks project to the local instance.

In order to copy projects to a local database, we need Start P**roject Administration** from the OpenWorks command menu, Right-click the name of a project database or an interpretation project to display the shortcut menu, as shown:



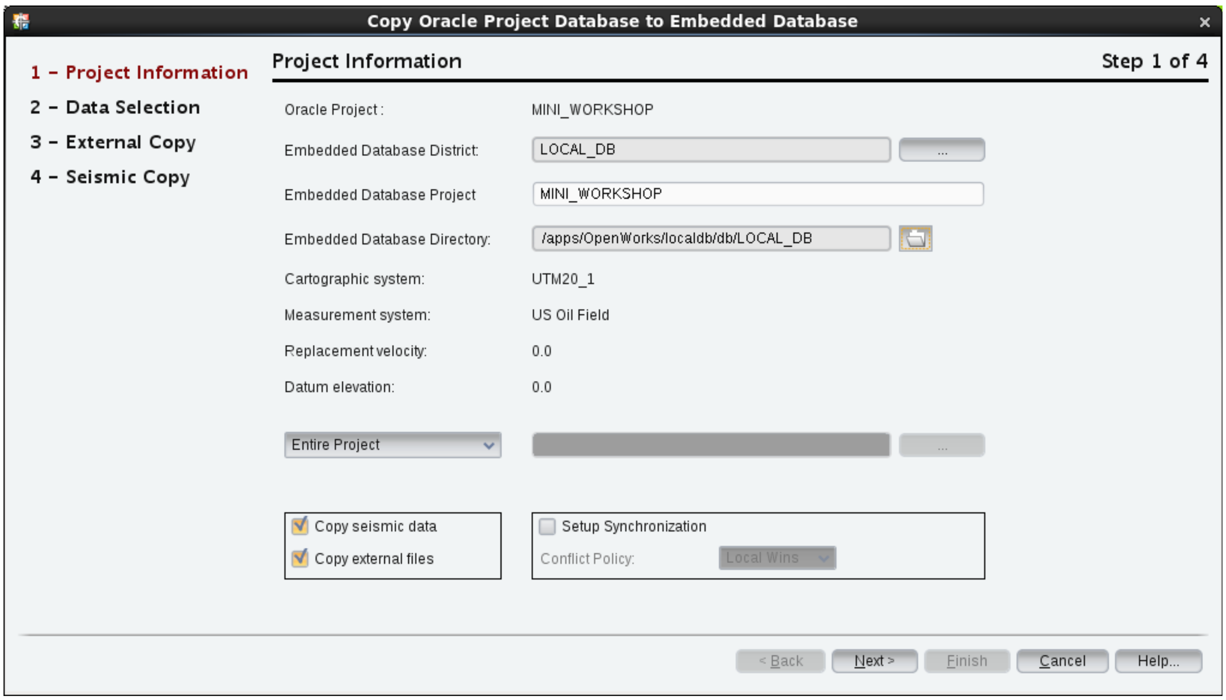
Select Copy Oracle PD to Embedded Database or Copy Oracle IP to Embedded Database PD, depending on whether you right-clicked the name of a project database (PD) or an interpretation project (IP).

The Copy Oracle Project Database to Embedded Database dialog displays with its first panel, Project Information.

- Entire Project
- Subset by an Area Of Interest (AOI) and a List
- Subset by an Interpretation Set

Entire Project

When Entire Project is selected in the Project Information panel, do the following:



In Embedded Database District:

Select the Local District to which the project will be copied. In this example, there is only one district. It is possible to multiple local Districts and SIDs.

In Embedded Database Project:

Type the name of Project.

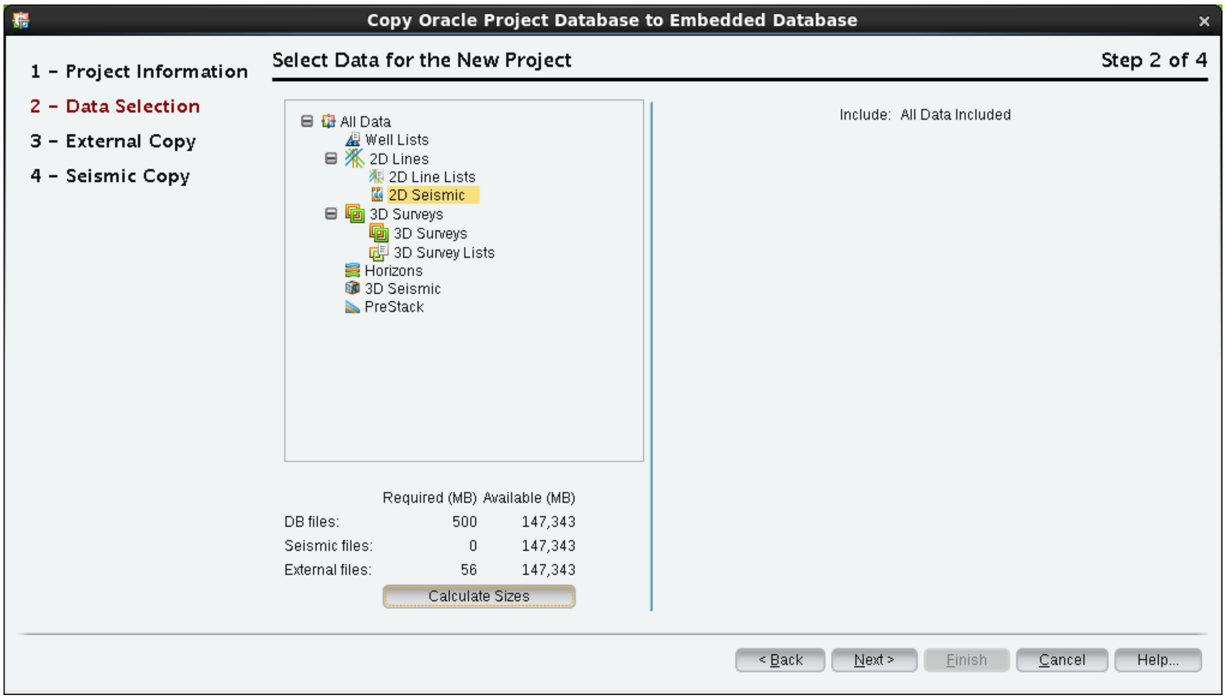
In Embedded Database Directory:

Select the location for the database files. We defined this area already. It is possible to have database files in multiples locations. This is to allow users to keep projects on different disks or partitions

Check Copy Seismic Data and Copy External Files:

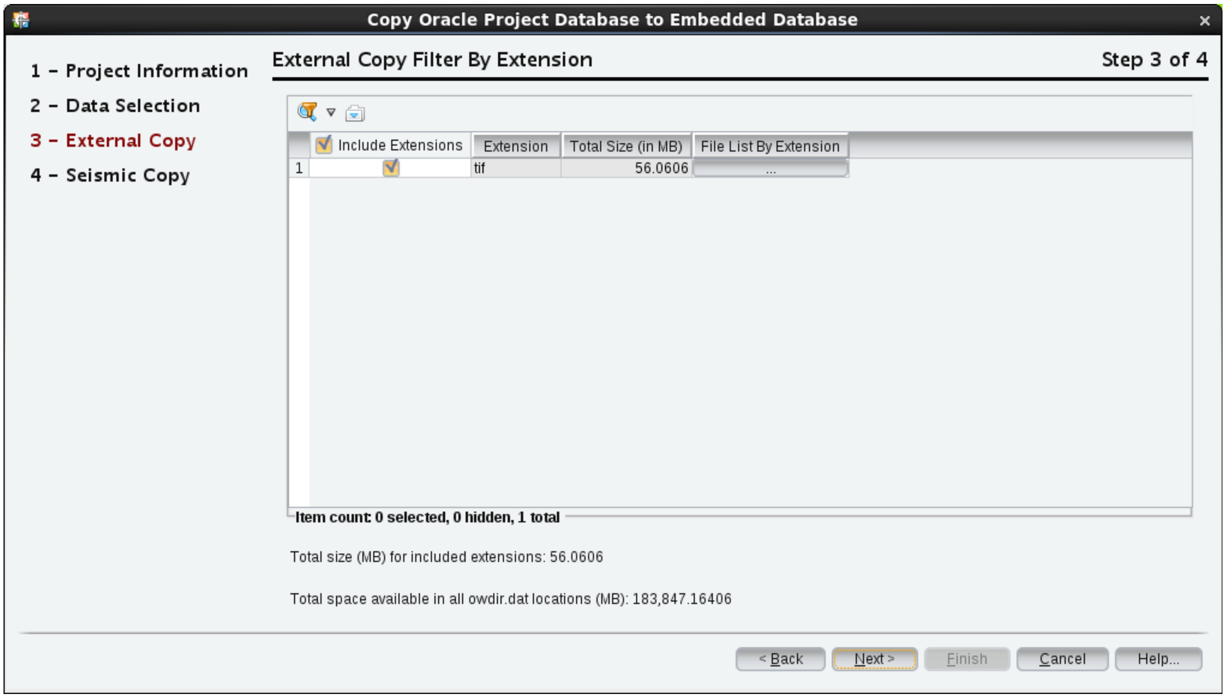
Click **Next**. The Select Data for the New Project panel displays.

But in this course we are only dealing with well data so there will be no seismic file as the figure shows.

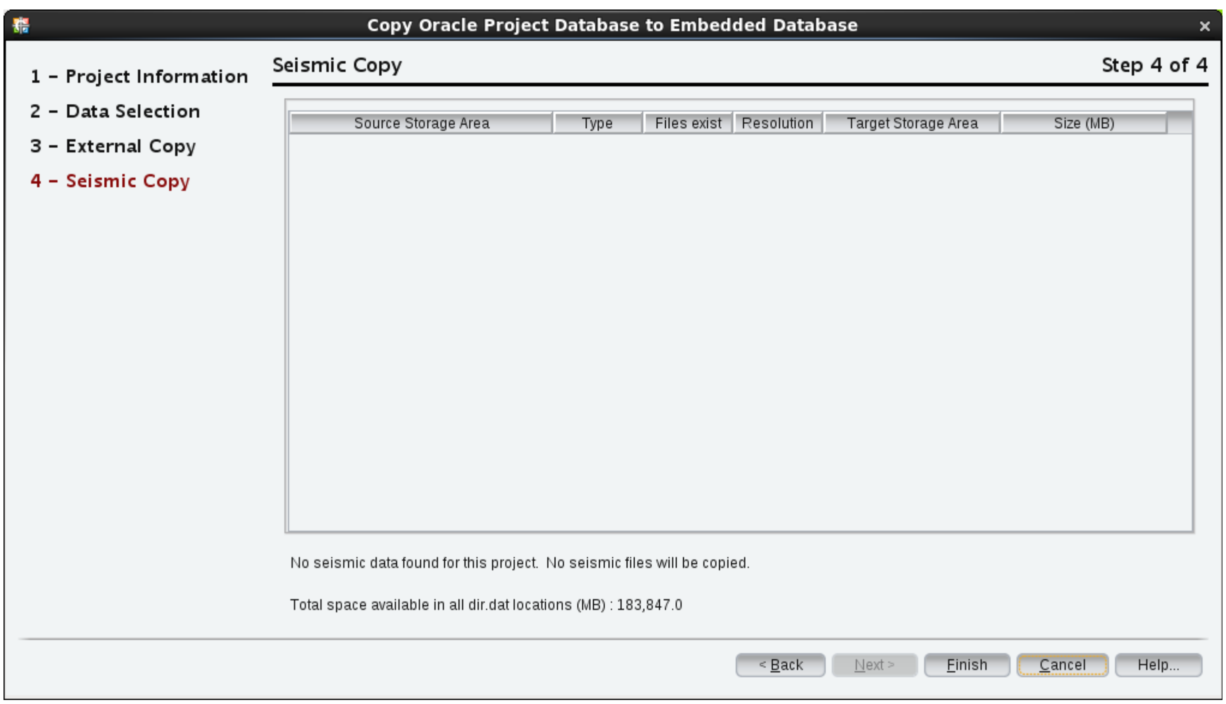


In Data Selection, click in **Calculate Sizes** to recalculates the seismic files required value.

Click **Next**. The External Copy Filter by Extension panel displays



Click **Next**. The Seismic Copy panel displays



As discussed earlier we are only using Well data so the project didn't have any seismic data.

Click **Finish** to copy the data. Starts copying process, when this process is completed, Click **Close**.

Subset by AOI or List

When Subset by AOI or List is selected in the Project Information panel, following are the options used:

None: Select this item if no well data should be included in the Embedded Database

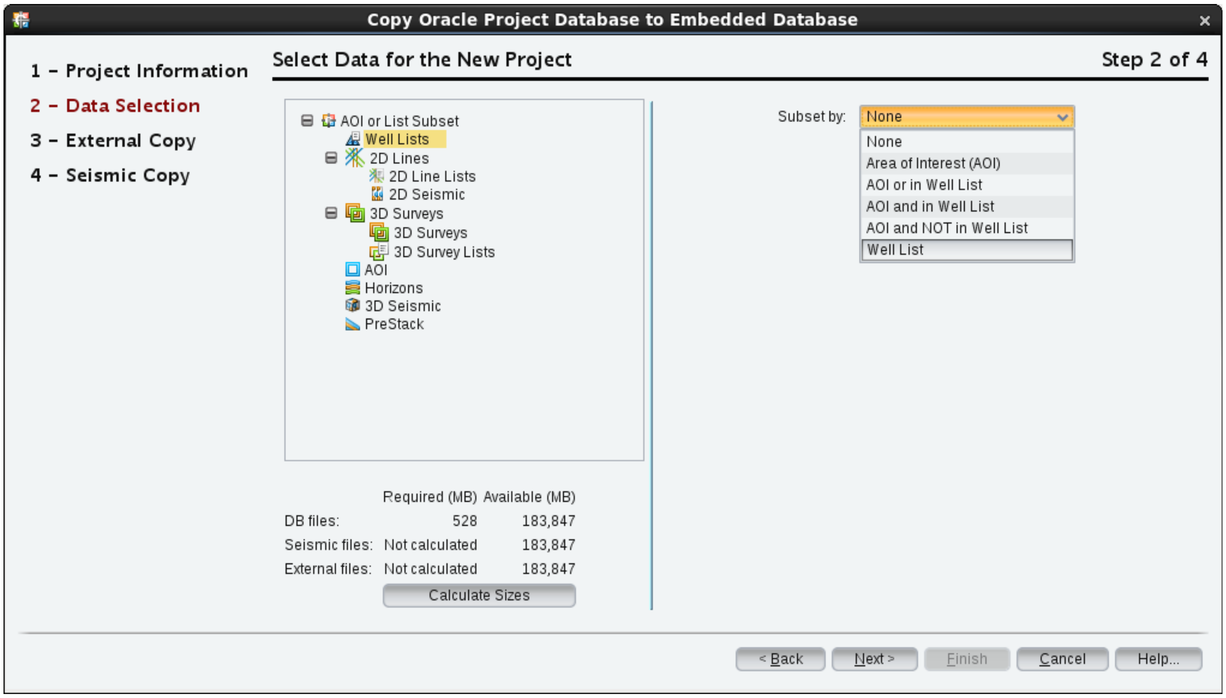
Area Of Interest (AOI): Only well data in the project database that are within the AOI (as defined in the Area of Interest pane in this dialog) are added to the Embedded Database project. A well and its data are considered in the AOI when either its surface location or its bottom hole location is within the AOI.

AOI Or In Well List: Only well data that are either within the AOI or are enumerated in the selected well list are added to the Embedded Database Project. A well and its data are considered in the AOI when either its surface location its bottom hole location is within the AOI.

AOI and In Well List: Only well data that are within the AOI and are enumerated in the selected well list are added to the Embedded Database Project. A well and its data are considered in the AOI when either its surface location or its bottom hole location is within the AOI.

AOI and Not in Well List: Only well data that are within the AOI and that are not enumerated in the selected well list are added to the Embedded Database Project. A well and its data are considered in the AOI when either its surface location or its bottom hole location is within the AOI.

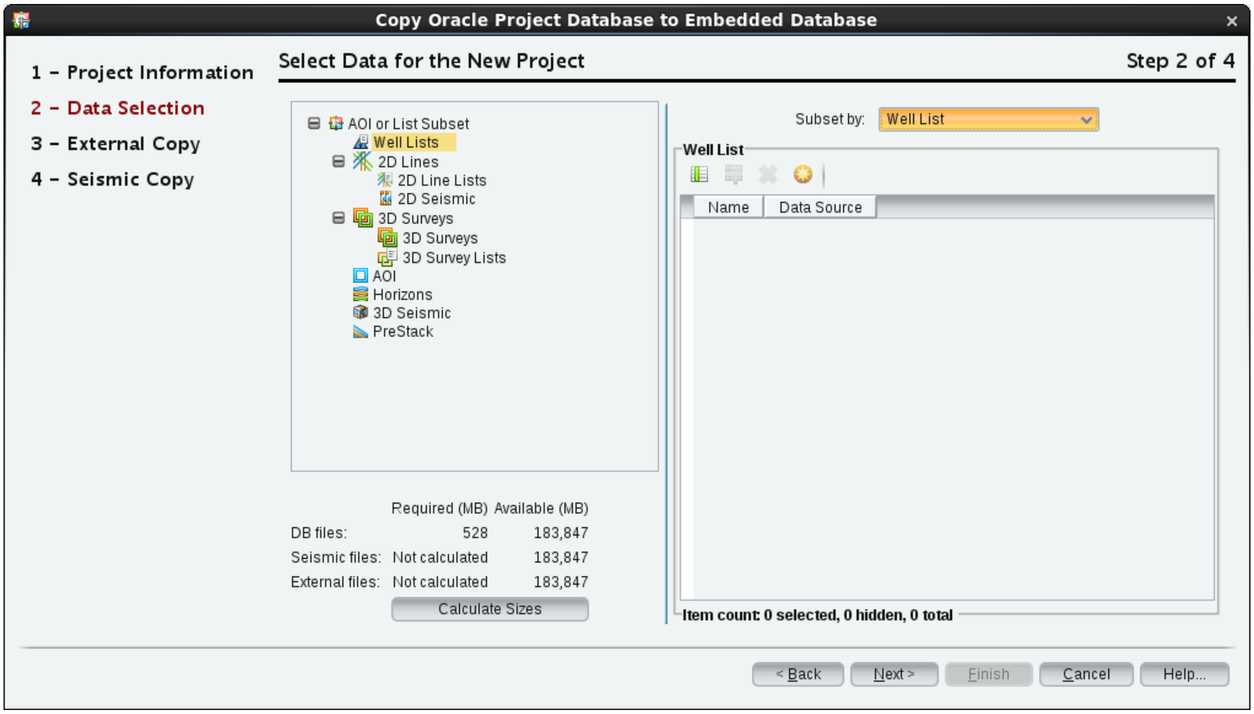
Well List: Only well data enumerated in the selected well list are added to the Embedded Database Project. An AOI has no effect on which wells are included in the Embedded Database Project.

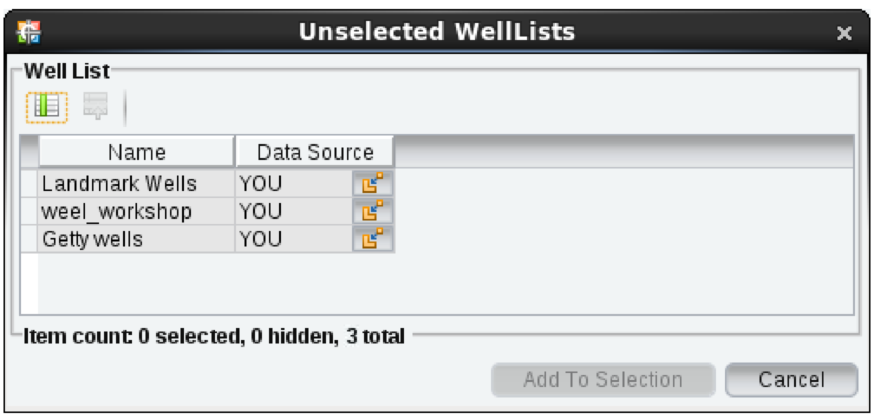


Make selections for each data type as showed below.

For Wells:

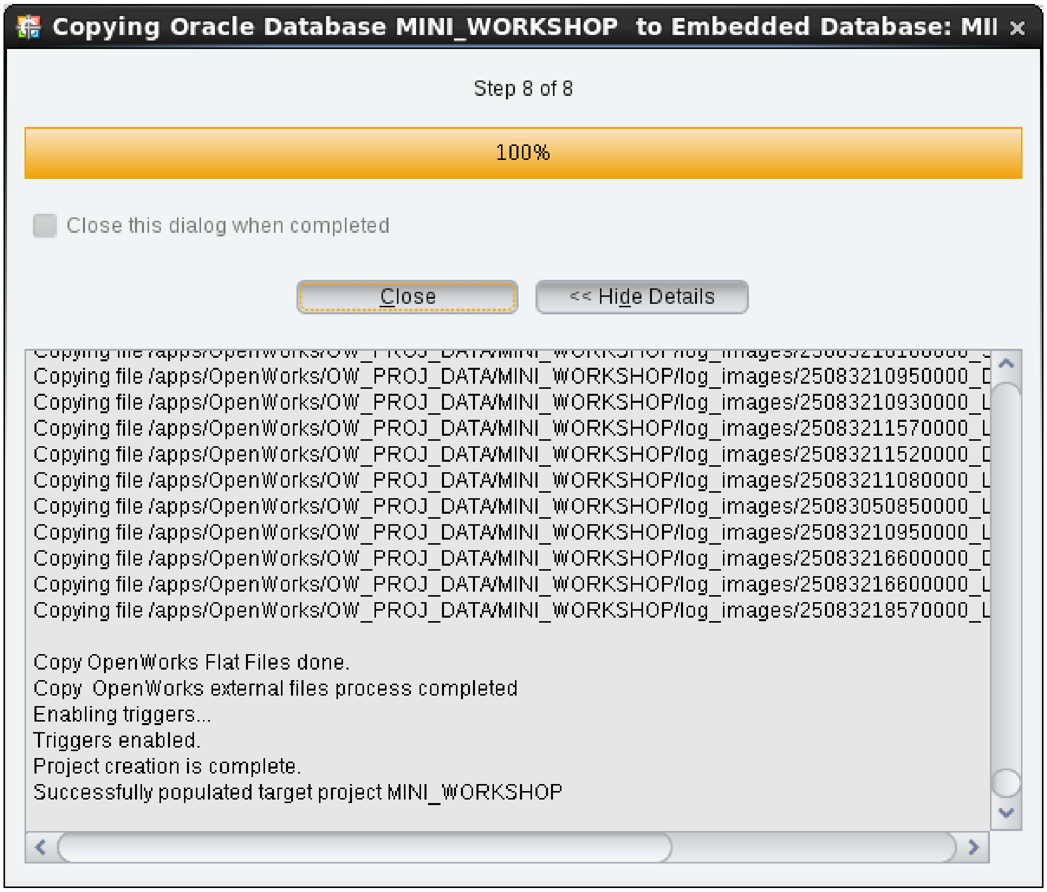
In Subset By select **Well List** and then click the **Add to Selection** icon:





Select the well list you want to copy, the Add To Selection Tab becomes active and add the well list.

Click **Finish** to copy the data.

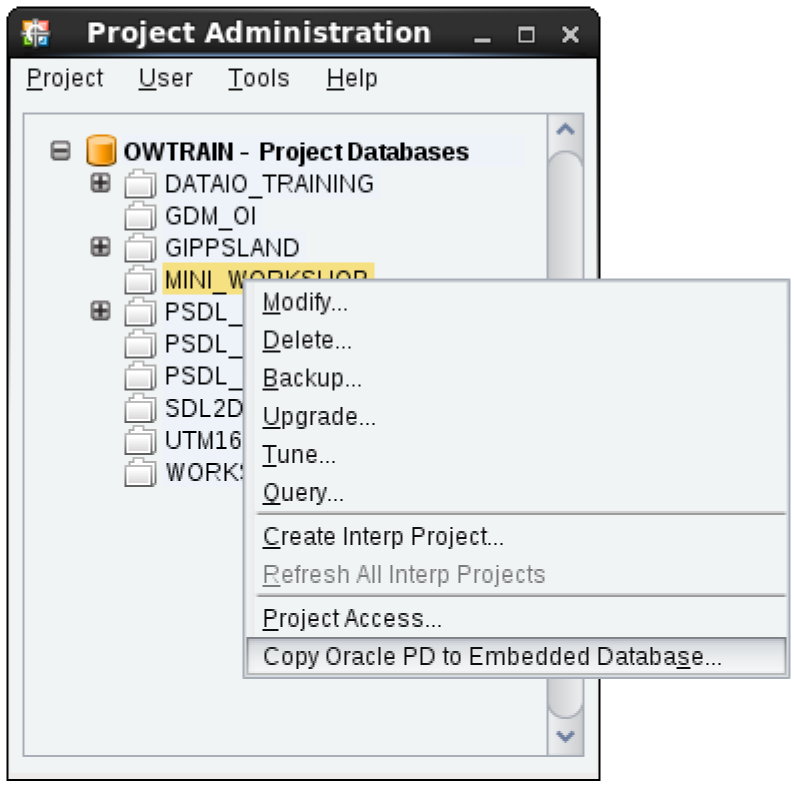

Copying Oracle Database MINI_WORKSHOP to Embedded Database: MII
Step 8 of 8
100%
Close this dialog when completed
Close
<< Hide Details
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083210950000_D
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083210930000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083211570000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083211520000_D
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083211080000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083050850000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083210950000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083216600000_D
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083216600000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083218570000_L
Copy OpenWorks Flat Files done.
Copy OpenWorks external files process completed
Enabling triggers...
Triggers enabled.
Project creation is complete.
Successfully populated target project MINI_WORKSHOP

Click **Close**.

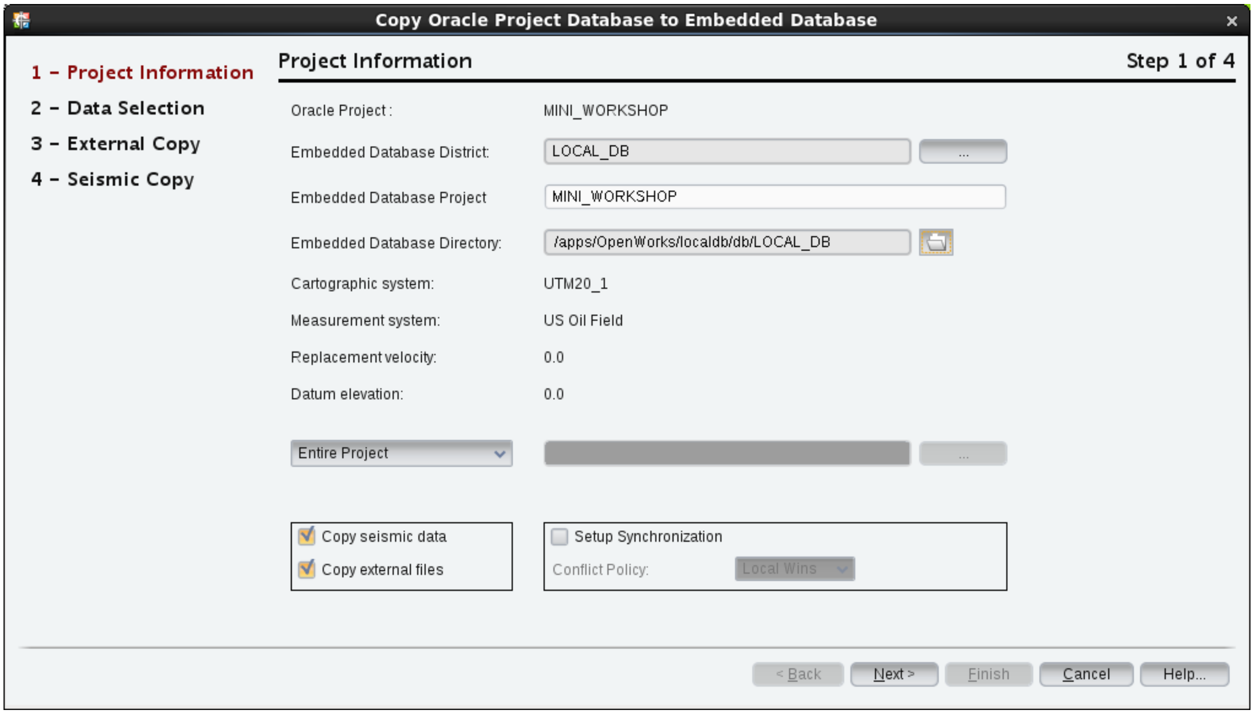
Exercise 9.9: Copying an Existing Oracle Project to an Embedded Database

1. Start Project Administration from the OpenWorks command menu, select **Project** > **Project Administration**.
   The **Project Administration** window displays:

2. Right-click the name of a project database MINI_WORKSHOP and select the **Copy Oracle PD to Embedded Database** option from the menu.

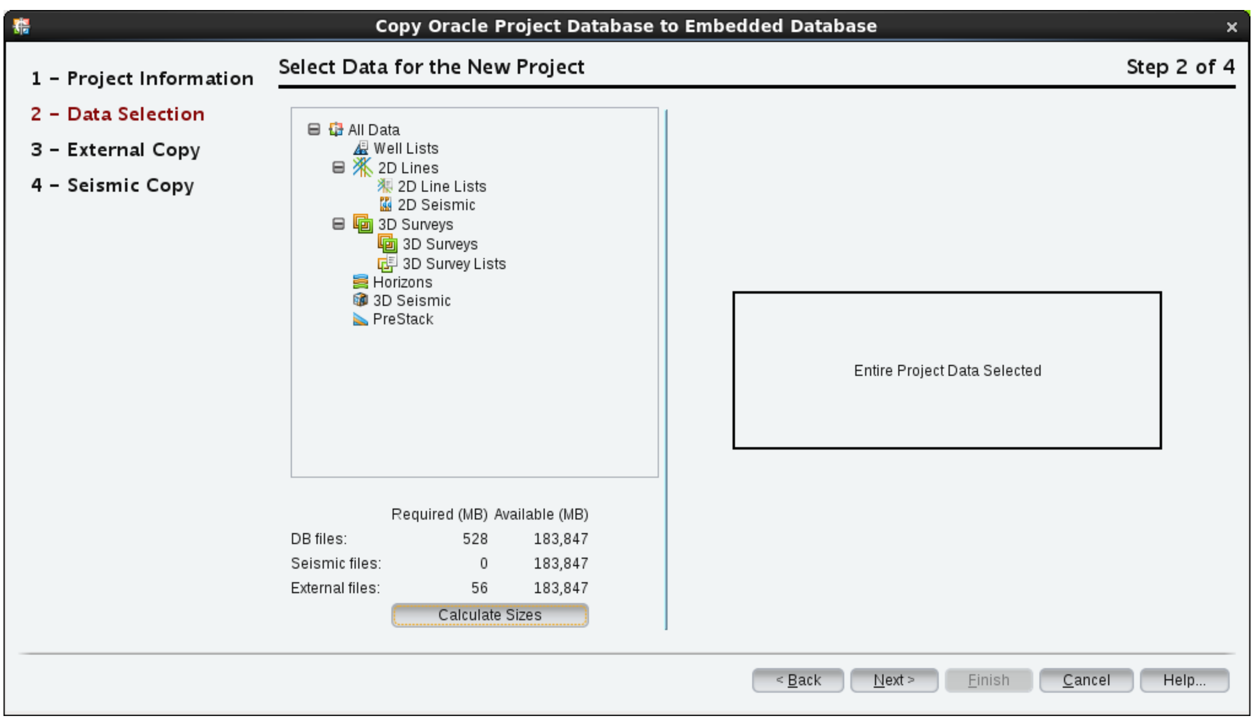


The **Copy Oracle Project Database to Embedded Database** dialog box appears:



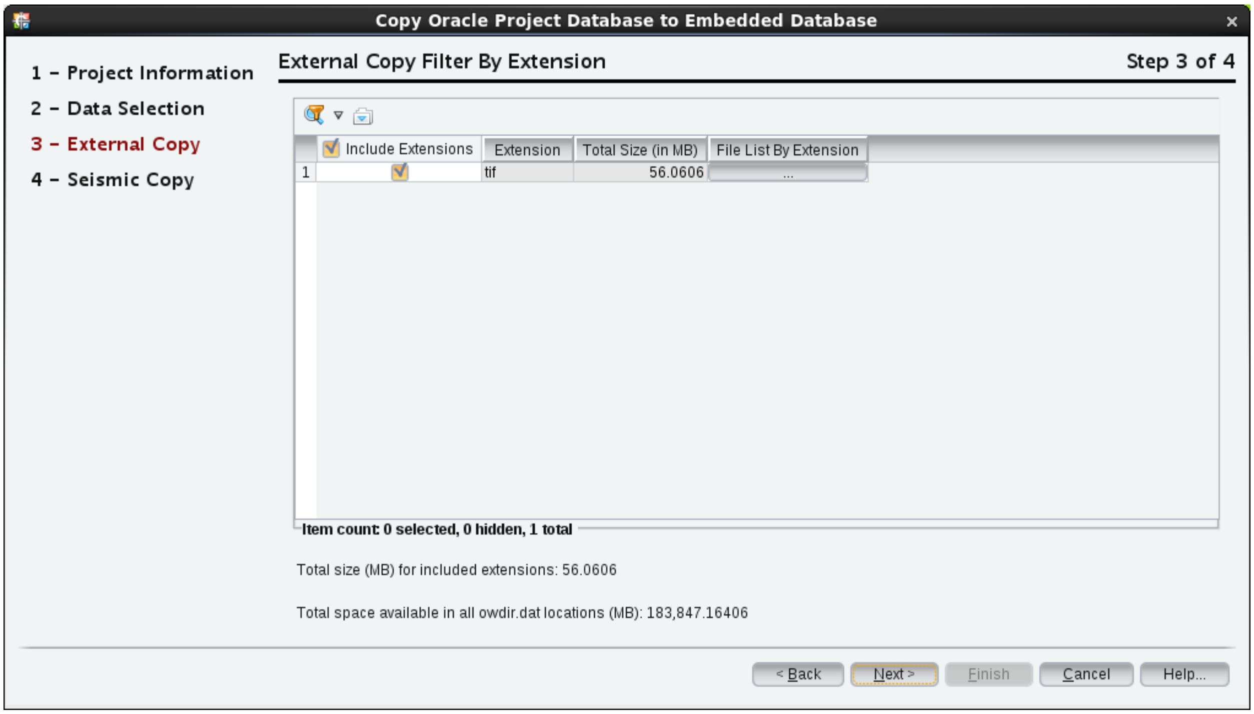
3. In the **Project Information** panel, select **Entire Project** from the list, and leave all options by default.

4. Press the **Next** button.
   The **Select Data for the New Project** panel displays:



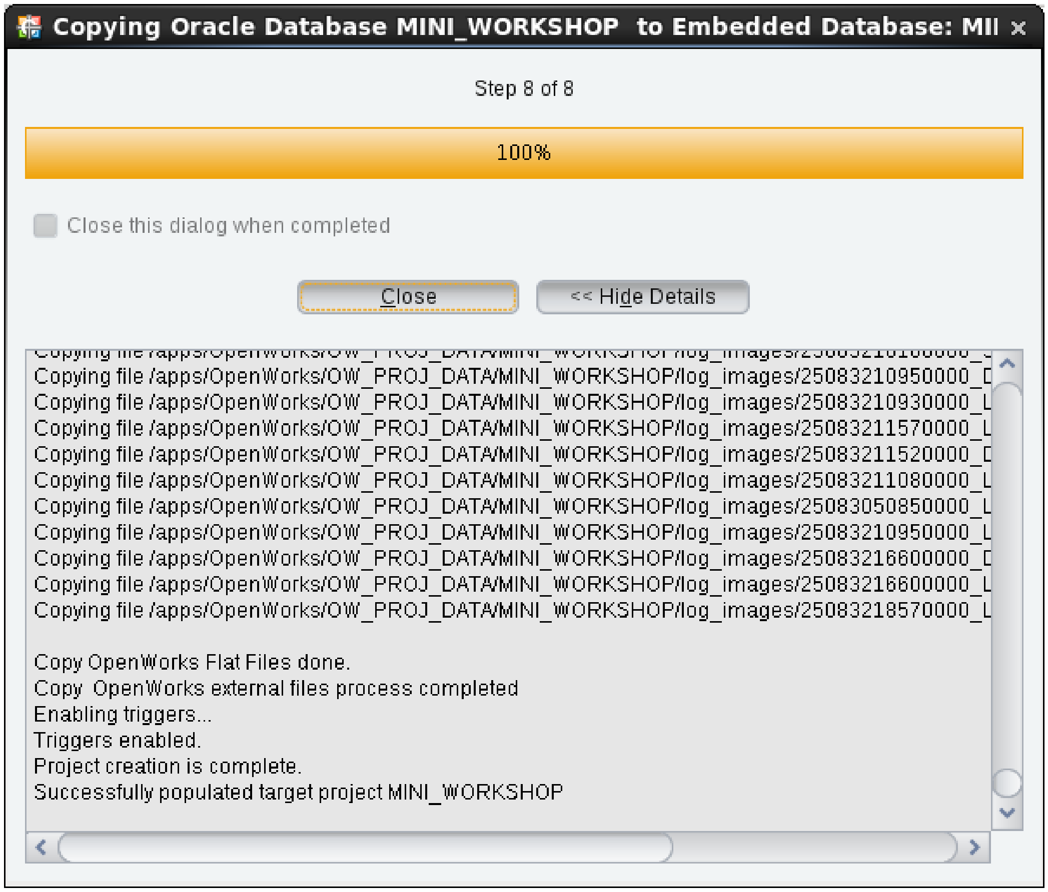
5. Click the **Calculate Sizes** button to recalculate the value of the well data files.

6. Click the **Next** button.
   The **External Copy Filter by Extension** panel displays:



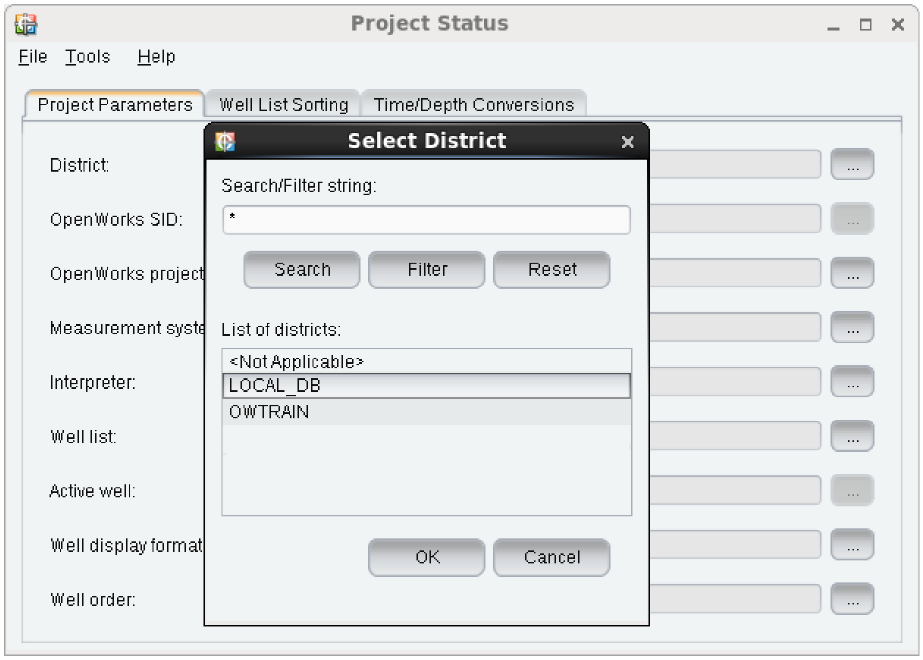
7. Click the **Next** button.
   The **Seismic Copy** panel displays with no seismic data shown.

8. Click the **Finish** button.
   The database is copied. After the process is complete, click the Close button to exit.


Copying Oracle Database MINI_WORKSHOP to Embedded Database: MII
Step 8 of 8
100%
Close this dialog when completed
Close
<< Hide Details
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083210950000_D
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083210930000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083211570000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083211520000_D
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083211080000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083050850000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083210950000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083216600000_D
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083216600000_L
Copying file /apps/OpenWorks/OW_PROJ_DATA/MINI_WORKSHOP/log_images/25083218570000_L
Copy OpenWorks Flat Files done.
Copy OpenWorks external files process completed
Enabling triggers...
Triggers enabled.
Project creation is complete.
Successfully populated target project MINI_WORKSHOP

Exercise 9.10: QC for the New Local Project

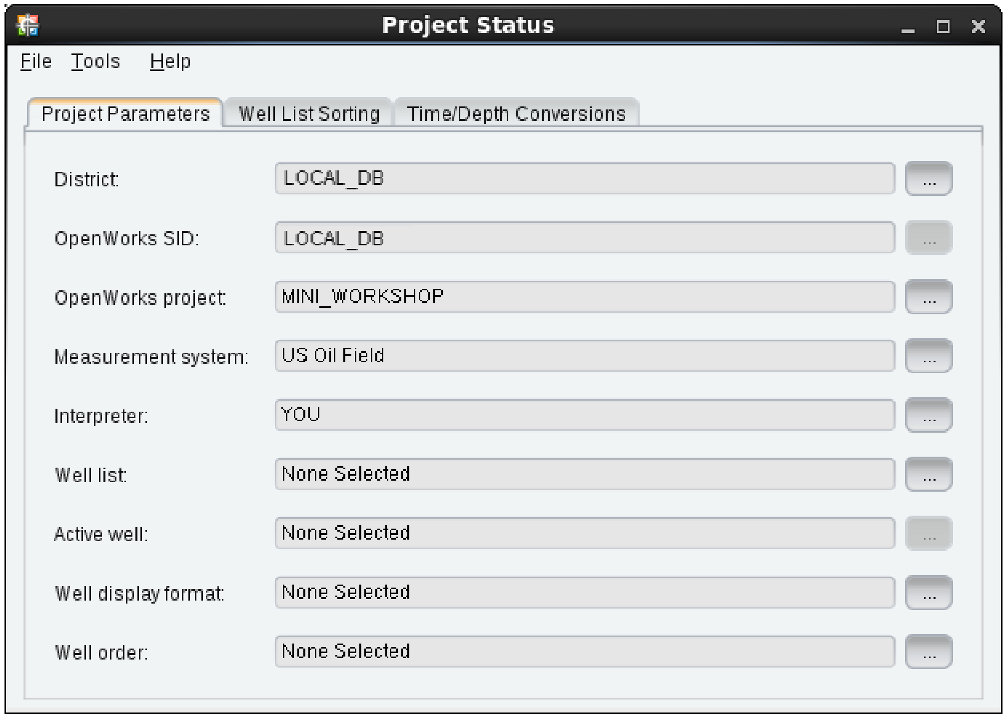
1. Start the **Project Status** tool, and change the district to LOCAL_DB.



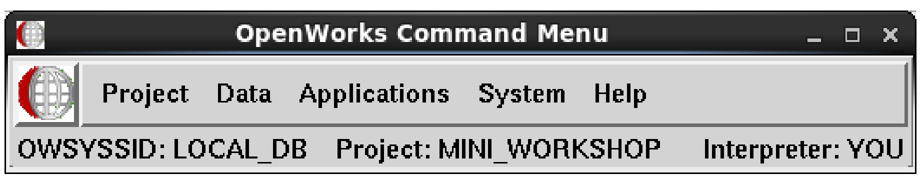
The OpenWorks SID changes to LOCAL_DB

2. Complete with the following setting in Project Parameters:

- OpenWorks software project: MINI_WORKSHOP
- Measurement System: US Oil Field
- Interpreter: YOU or <your_initials>

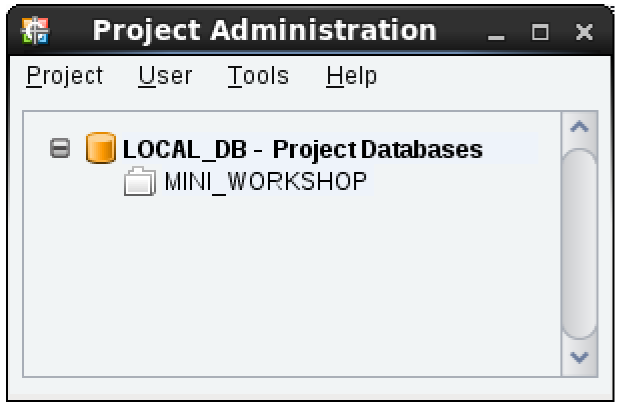


3. The OpenWorks Command Menu will change to the new local OWSYSSID:LOCAL_DB.



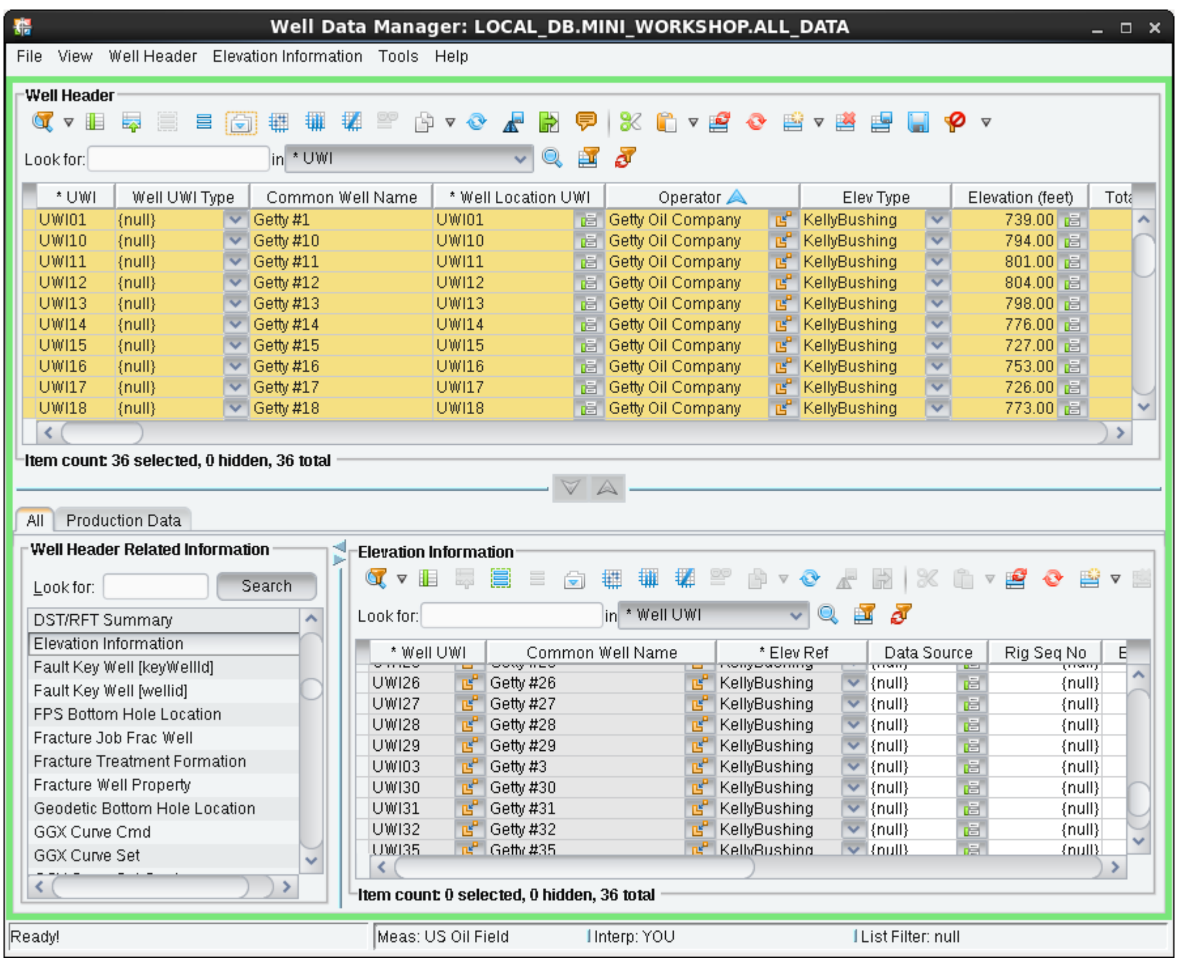
Now, you are able to administer the project and data in an embedded database with the same tools that you are familiar with in dealing with projects and data in an OpenWorks database instance in an Oracle database.

4. To view the new local project list, select **Project** > **Project Administration**.



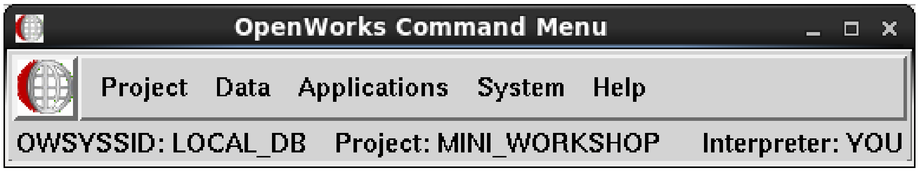
5. In order to check the well data copied locally, start Well Data Manager from **Data** > **Management** > **Well Data Manager**.

6. In Filter Project Data, select the **All Well Header** option.



Exercise 9.11: Create a New Well in the Local Project

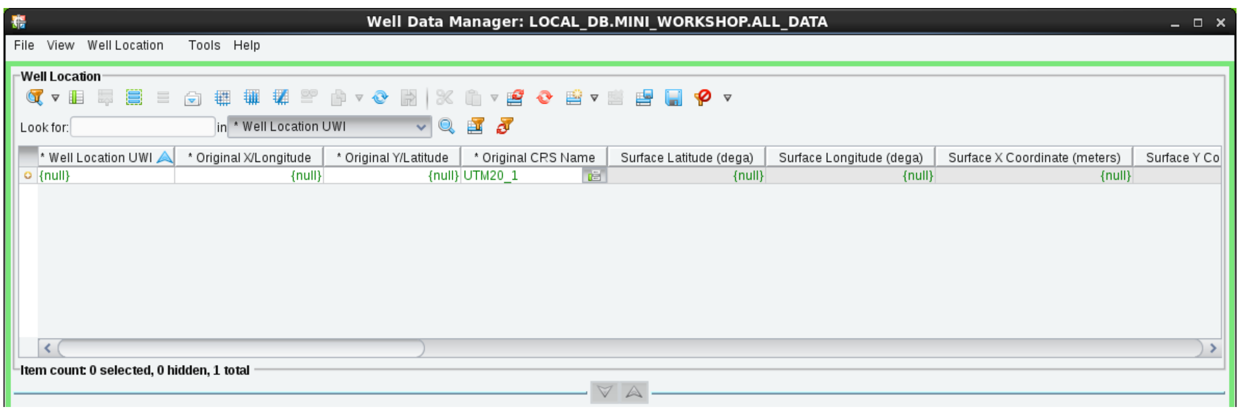
1. The OpenWorks Command Menu changes to the new local OWSYSSID: LOCAL_DB.



2. Start the Well Data Manager from the OpenWorks command menu by selecting **Data** > **Management** > **Well Data Manager**.

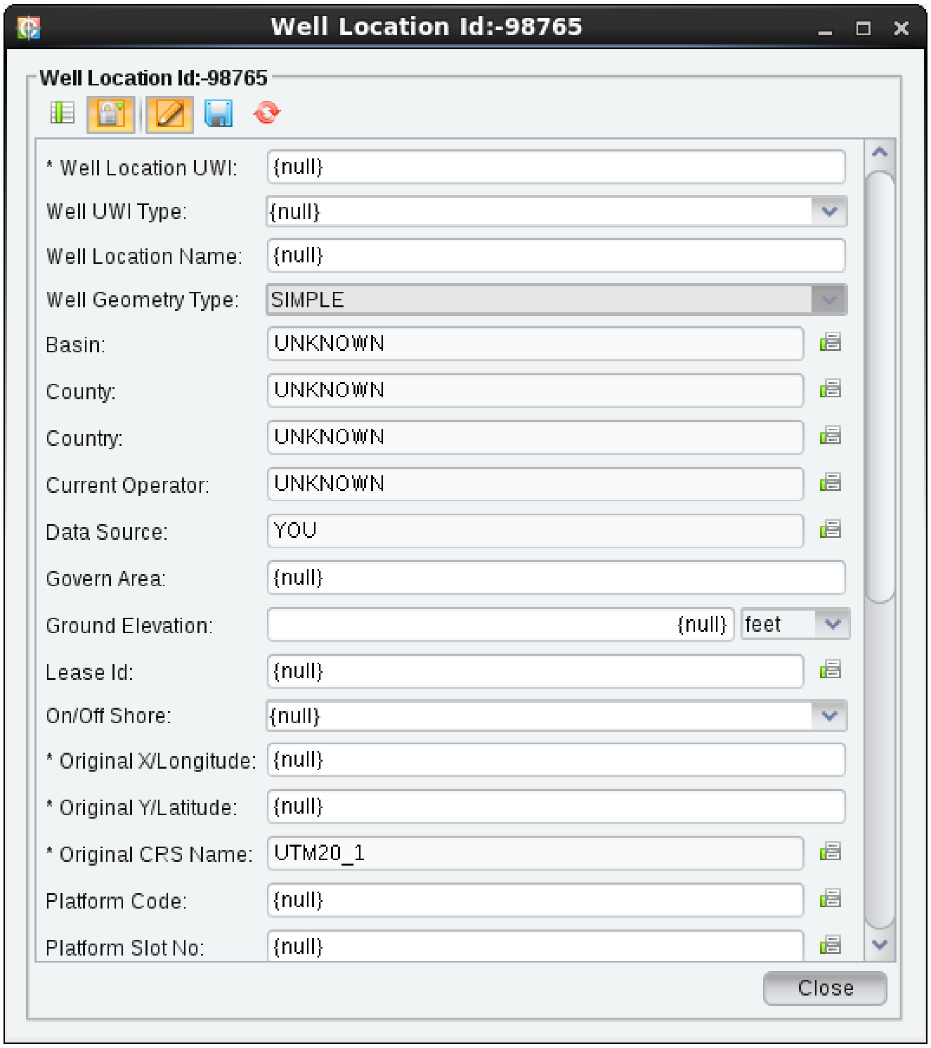
3. Set Top Level Focus to Well Location and when from the Filter Project Data select No Well Location. This keeps the display clean, only showing the data we are going to add to it.

4. Click the **Add New Well Location** icon .



A new row is added to the Well Location table. Text in this row appears in green type, indicating this is new information which has not been saved to the database.

5. Select the newly created row and **MB3** in the Well Location table, and select the **Open in Form View** option from the menu.



6. Fill out the new form with the following information. Either type in, or if there is a valid values button, use that and select from the list provided. After you enter this information press the save changes icon .

Table 1:

Well Location UWI	5000
Original CRS Name	UTM20_1
Original X/Longitude	443856.16
Original Y/Latitude	1245038.76

Table 1:

Well Location Name	5000 Platform Local
Current Operator	HALLIBURTON
Well UWI Type	UWI
County	TEXAS
Country	UNITED STATES OF AMERICA
State	TEXAS

7. Save the new Well Location to the database by clicking the **Save** icon at the top of the form view. Click **Close** to exit form view and return to the main Well Data Manager window.

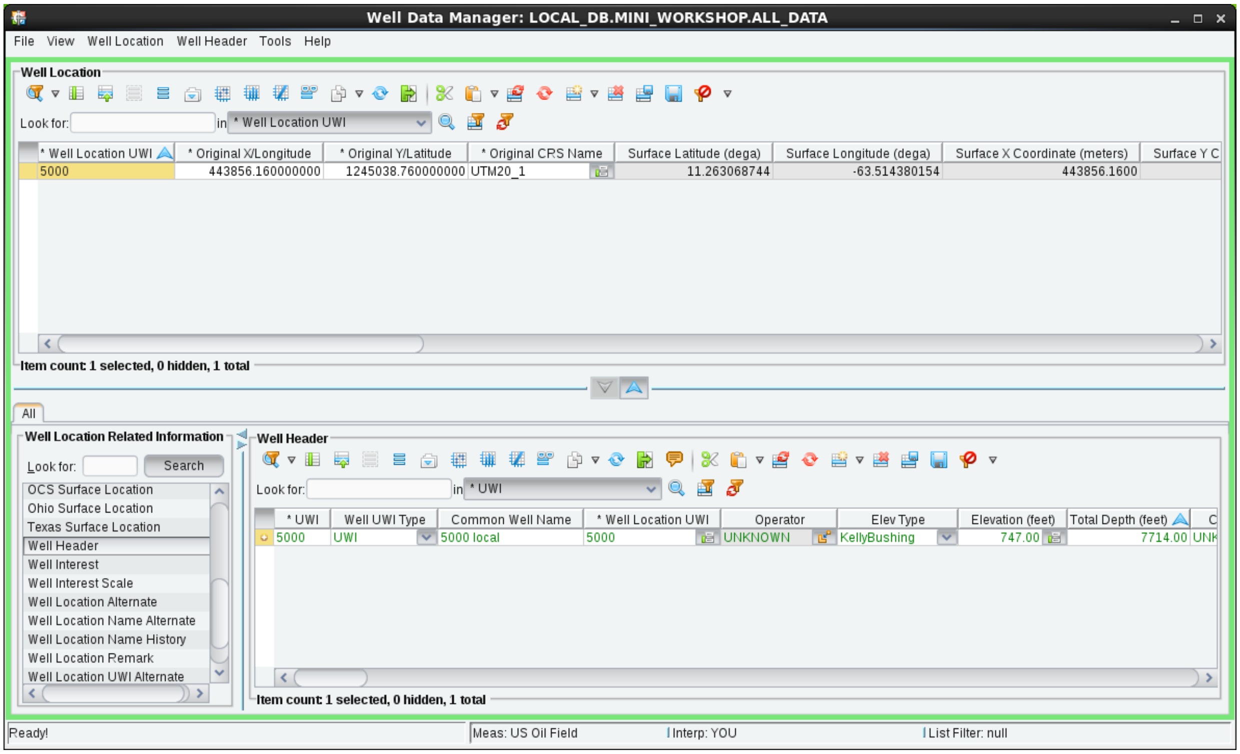
8. With the Top Level Focus on Well Location, highlight the row you just created and select **Well Header** in the bottom pane Well Location Related Information menu.

9. Click the **Add New Well Header** icon  in the Well Header Table (bottom pane).
   Notice that the new row is automatically linked to the Well Location selected in the upper pane by matching Well Location ID numbers. At this point no values in the Well Location have been copied across, however, when the row is saved this will be done.

10. Add the following information to the new Well Header row. This time, remain in table view:

Table 2:

UWI	5000
Well UWI Type	UWI
Common Well Name	5000 local
Elevation Type	Kelly Bushing
Elevation	747
Total Depth	7714
Current Status	OIL
Restricted Data Indicator	Y

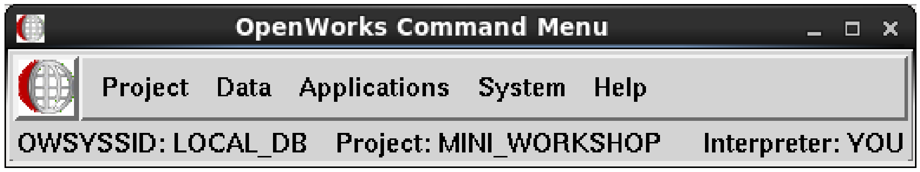


11. Commit the new Well Header to the database by clicking the **Save All Rows** icon in the bottom pane.

12. Review the new loaded row. Notice the updated fields.

Exercise 9.12: Transferring the New Well into the Regional Project using PDT

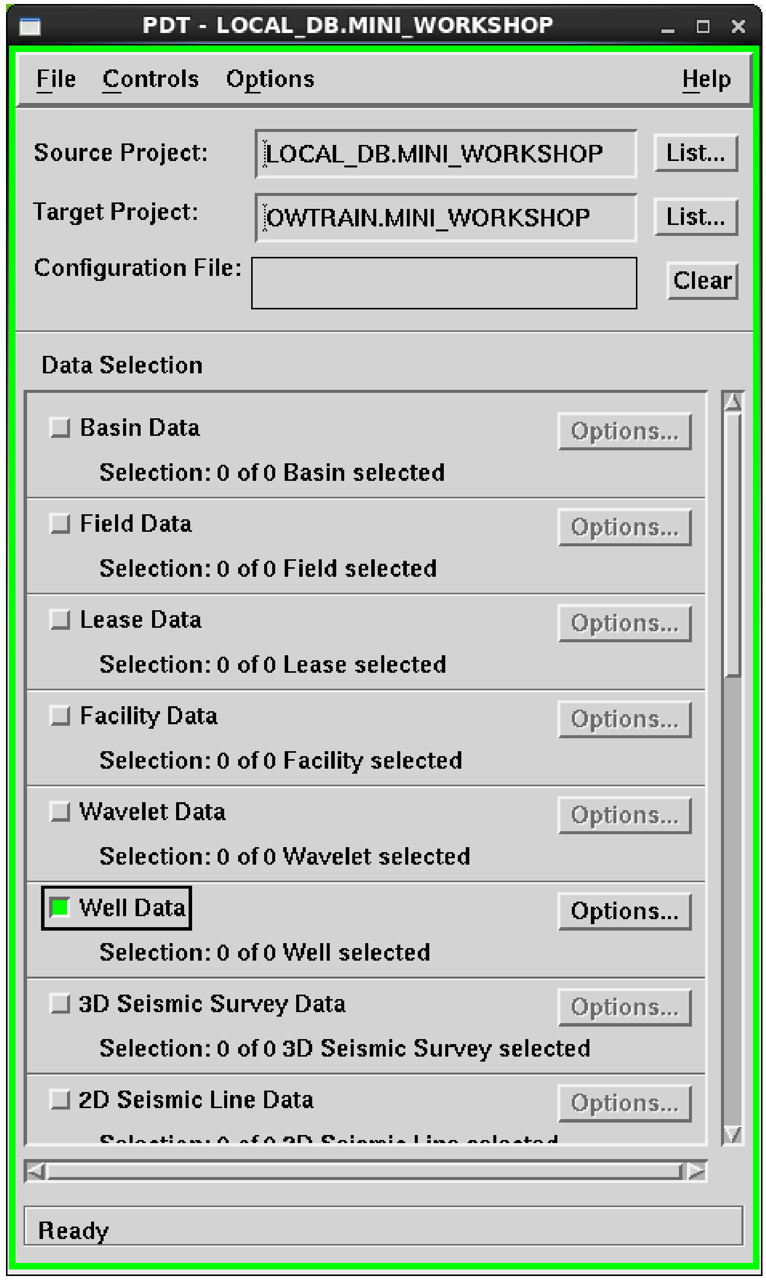
1. From the OpenWorks Command Menu changed to the new local **OWSYSSID:LOCAL_DB**.



2. Start the Project Data Transfer from the OpenWorks software command menu by selecting **Project > Project Data Transfer**.

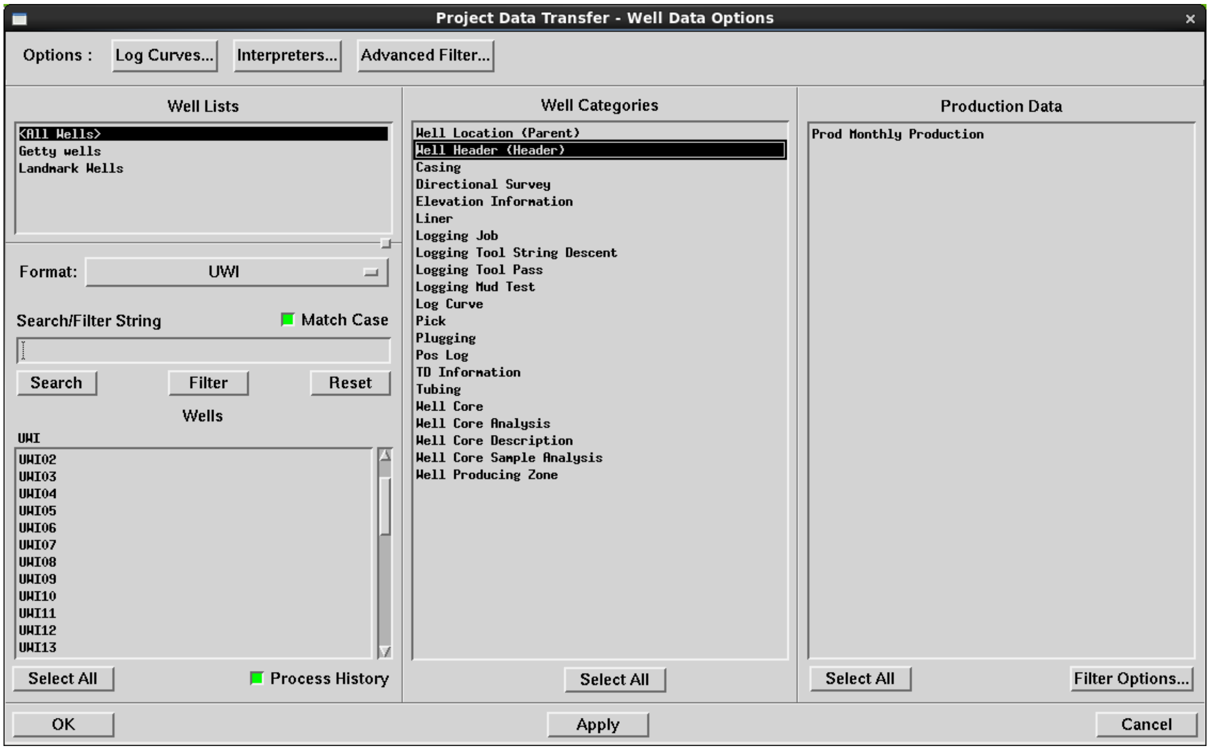
3. The Source Project is selected by default with **LOCAL_DB.MINI_WORKSHOP**. Select the Target Project to the Oracle Project **OWTRAIN.MINI_WORKSHOP.**

4. From the Data Selection List, toggle On **Well Data**.

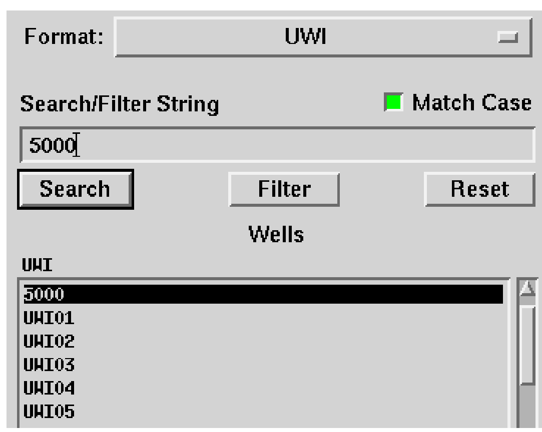


5. Click the **Options** button for the Category Well Data.

6. From PDT, under the section Well Lists, select **All Wells**, as shown:

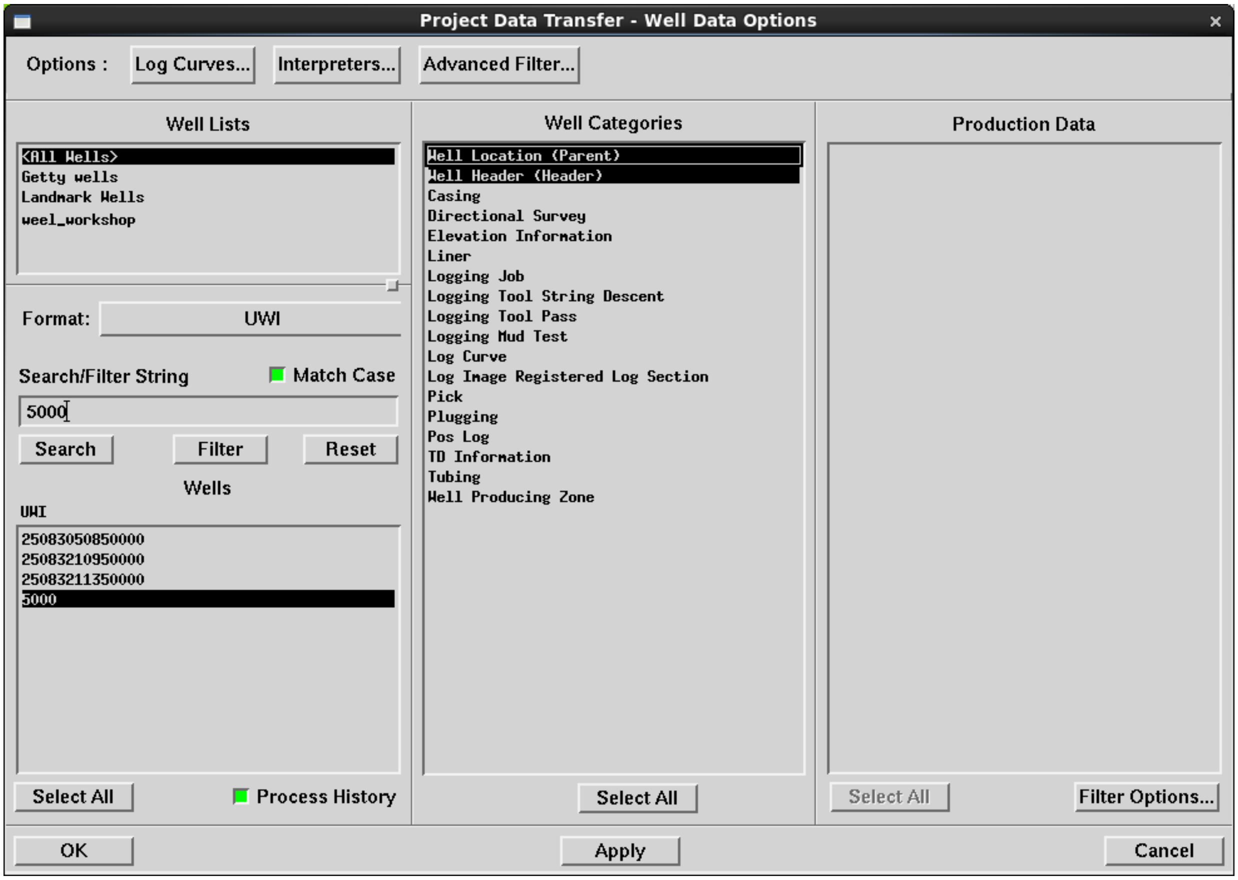


7. In Search Filter String, enter **5000** and click the **Filter** button



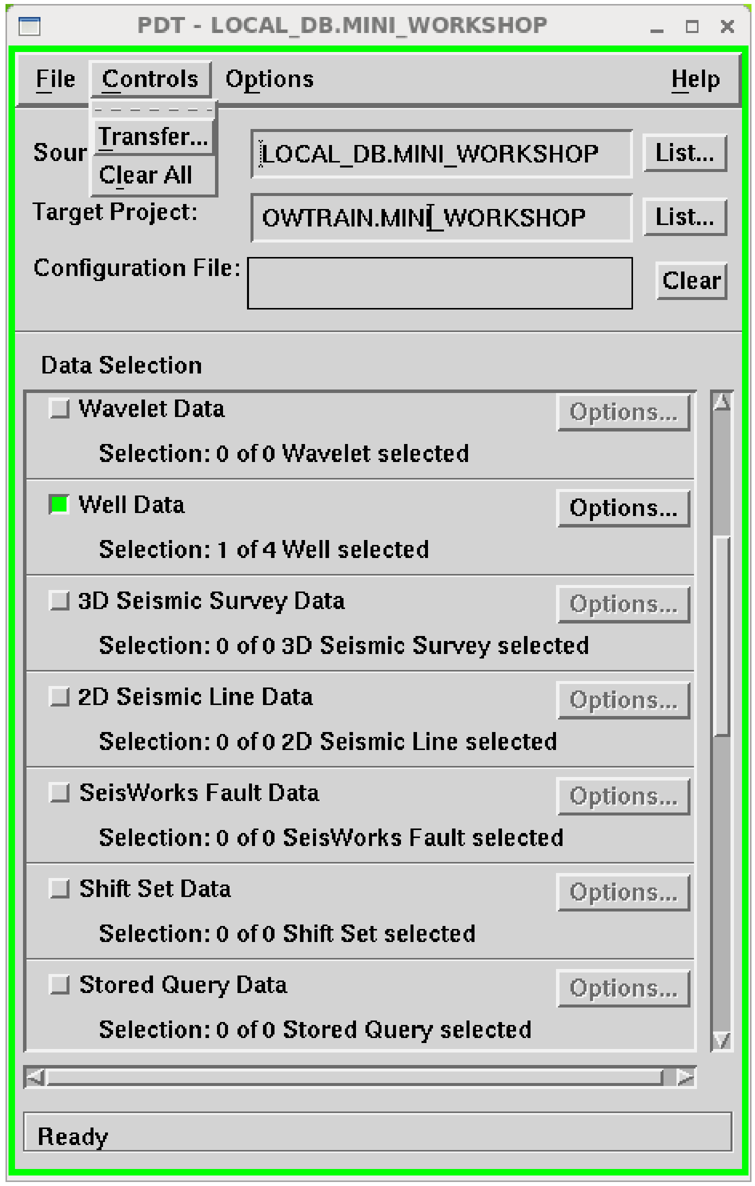
8. Select the well **5000** from the **UWI** list.

9. From the Well Categories, select **Well Location (Parent)** and **Well Header.**

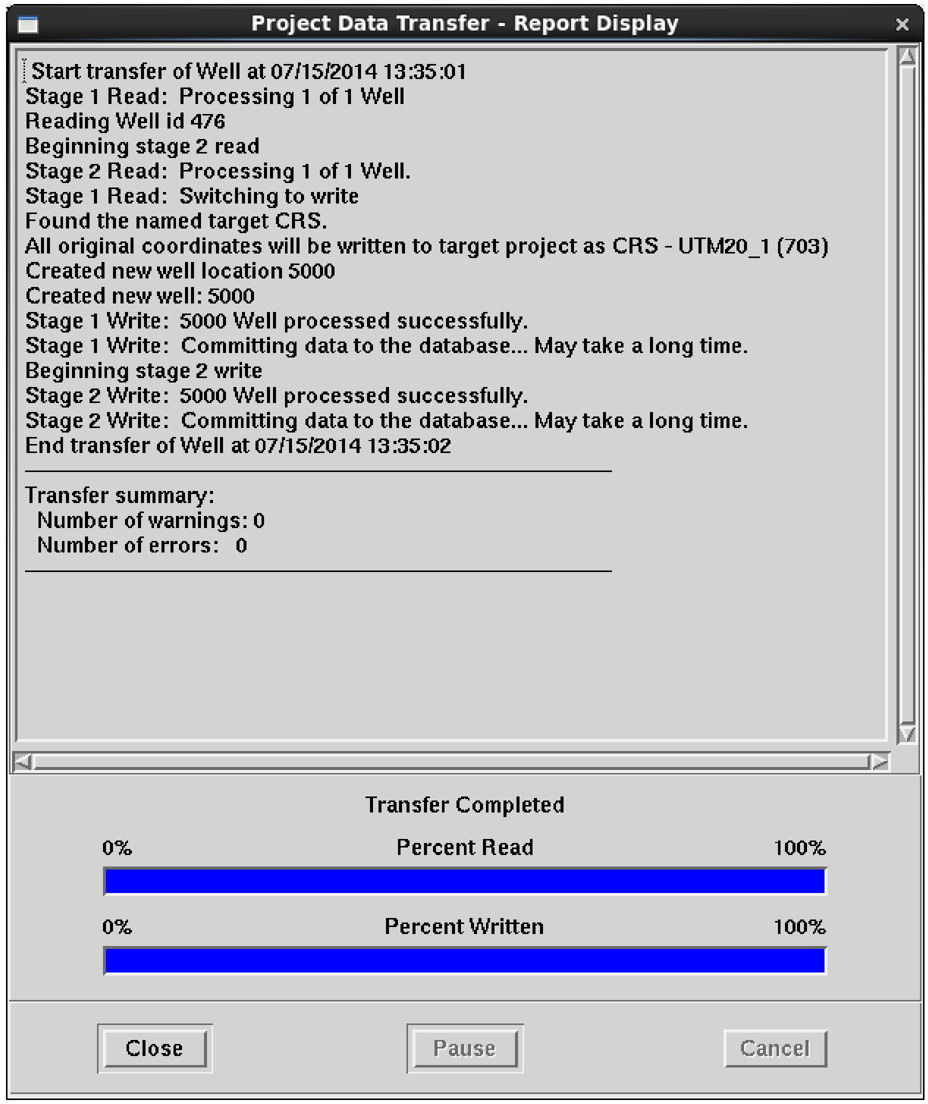


10. Click the **OK** button.

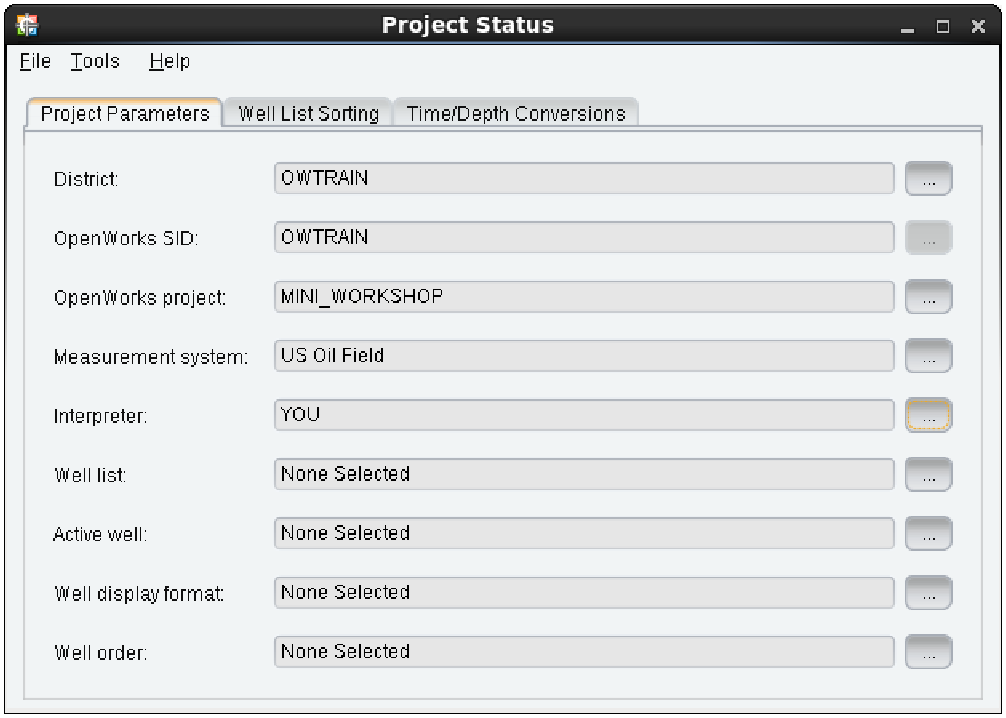
11. From the PDT menu, select **Controls** > **Transfer**.



The *Project Data Transfer Report Display* window appears.



12. Check the well transferred to the regional project. Start from the OpenWorks Command Menu, from **Project > Project Status Tool**, and complete with the following settings in Project Parameters.

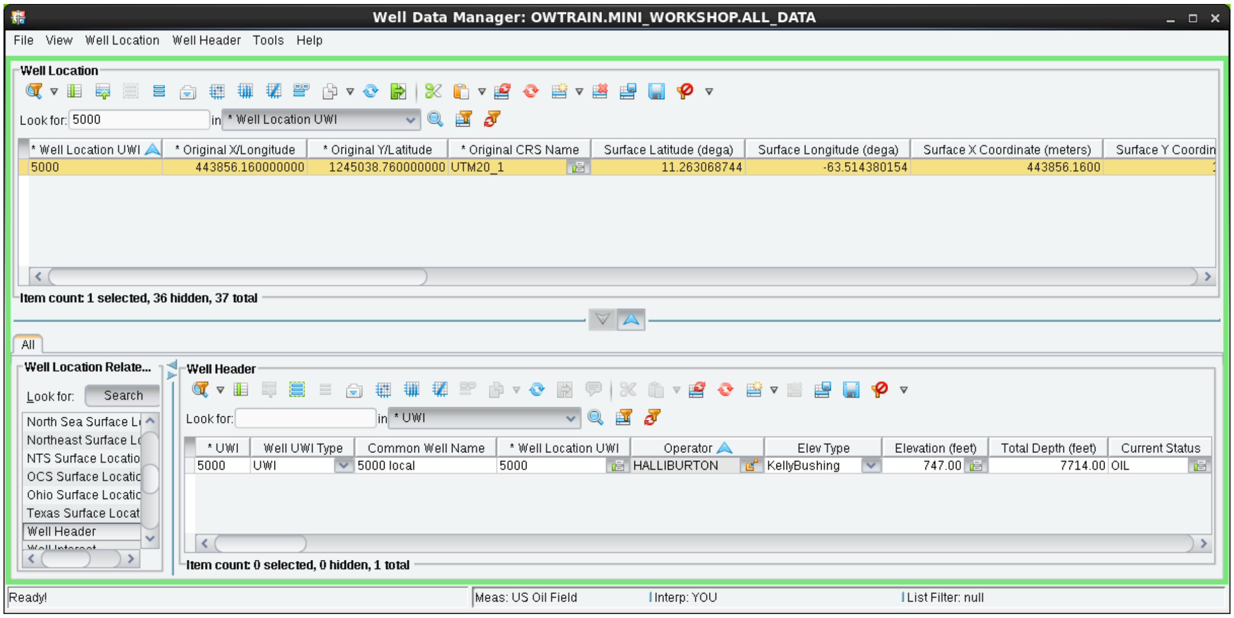


13. Launch Well Data Manager from the OpenWorks command menu by selecting **Data > Management > Well Data Manager**.

14. Within Well Data Manager, select **File > Top Level Focus to Well Location** and when the *Filter Project Data* window appears, select **All Well Location**

15. Highlight the **5000** location in the Well Location pane.

16. Click **Well Header** from the list of Well Location Related Information to view the loaded Well Header.


Well Data Manager: OWTRAIN.MINI_WORKSHOP.ALL_DATA
File View Well Location Well Header Tools Help
Well Location
Look for: 5000 in * Well Location UWI
* Well Location UWI * Original X/Longitude * Original Y/Latitude * Original CRS Name Surface Latitude (dega) Surface Longitude (dega) Surface X Coordinate (meters) Surface Y Coordin
5000 443856.160000000 1245038.760000000 UTM20_1 11.263068744 -63.514380154 443856.1600
Item count: 1 selected, 36 hidden, 37 total
All
Well Location Relate...
Look for: Search
North Sea Surface L
Northeast Surface L
NTS Surface Locatio
OCS Surface Locatio
Ohio Surface Locatio
Texas Surface Locat
Well Header
Well Header
Look for: in * UWI
* UWI Well UWI Type Common Well Name * Well Location UWI Operator Elev Type Elevation (feet) Total Depth (feet) Current Status
5000 UWI 5000 local 5000 HALLIBURTON KellyBushing 747.00 7714.00 OIL
Item count: 0 selected, 0 hidden, 1 total
Ready! Meas: US Oil Field Interp: YOU List Filter: null

Chapter 10

Data Loading Workshop

This workshop is a supplement to the course exercises. It is a good opportunity for you to put your new knowledge to work. Once completed, you should be more comfortable with the data loading tools.

Workshop Objectives

During the course of this workshop, you will:

- Create an OpenWorks software project.
- Load and verify well data.
- Load and verify position log data.
- Load and verify log curve data.

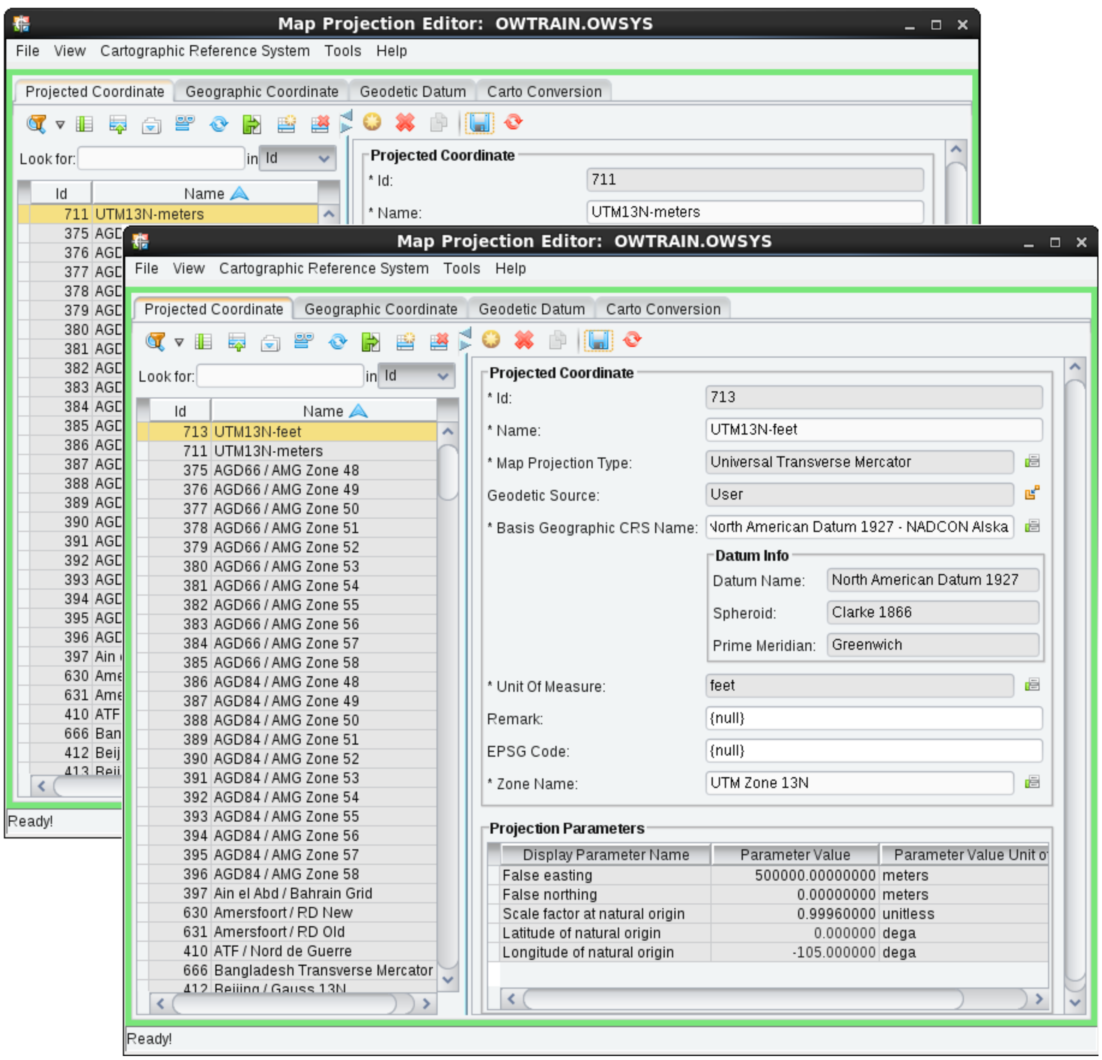
Creating a Project

You must create a new project before you can begin loading the data. Use **Project > Project Administration** to create a new project and define two cartographic projections. (Refer to Chapter 2 as needed.)

1. **Name** your project whatever you want.

2. Click the **Cartographic Reference System: List** button.

   Use the **Create** option on the *Select Coordinate System* window to open the **Map Projection Editor**, then select **File > New** to create two new projection coordinate systems: **UTM13N-meters** and **UTM13N-feet**.

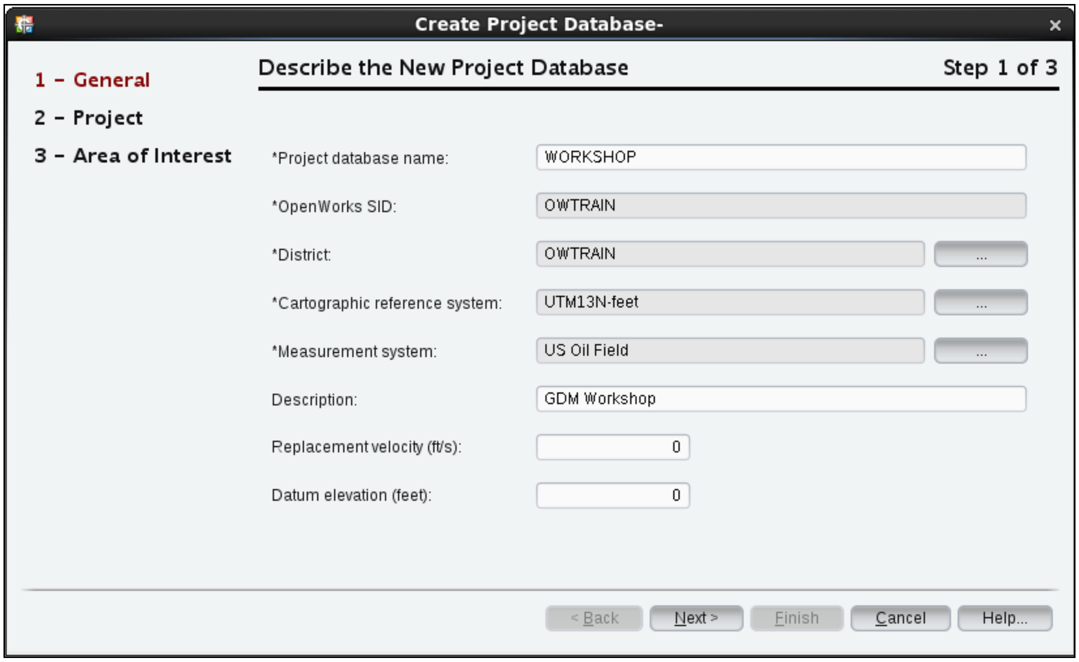


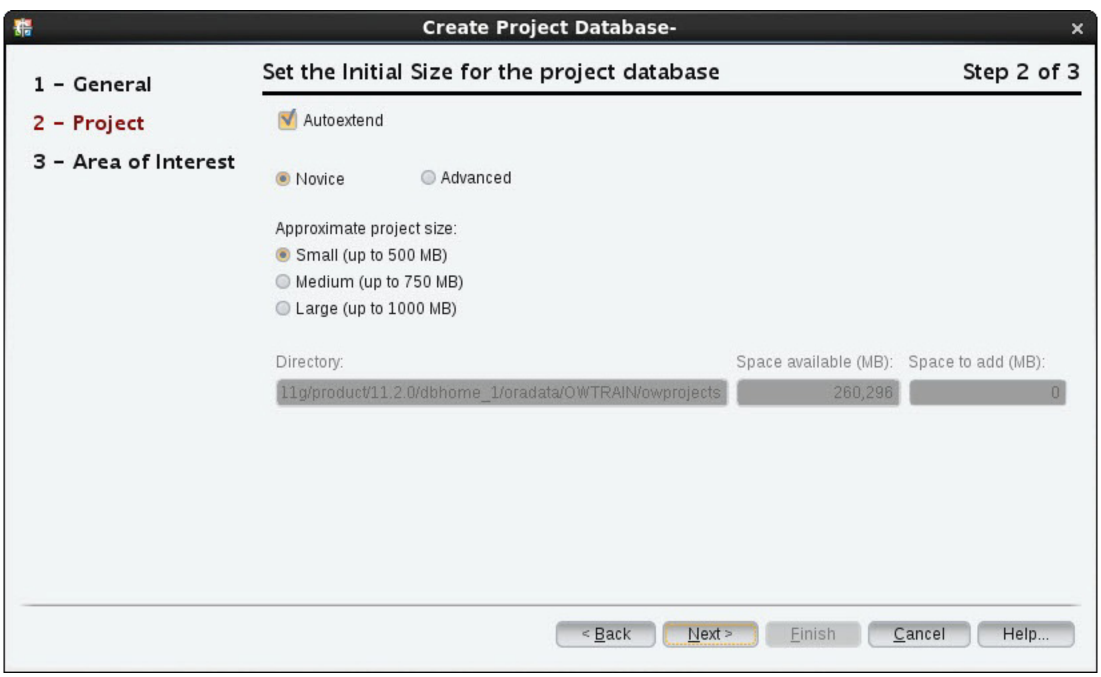
3. **Close** all the dialog boxes.

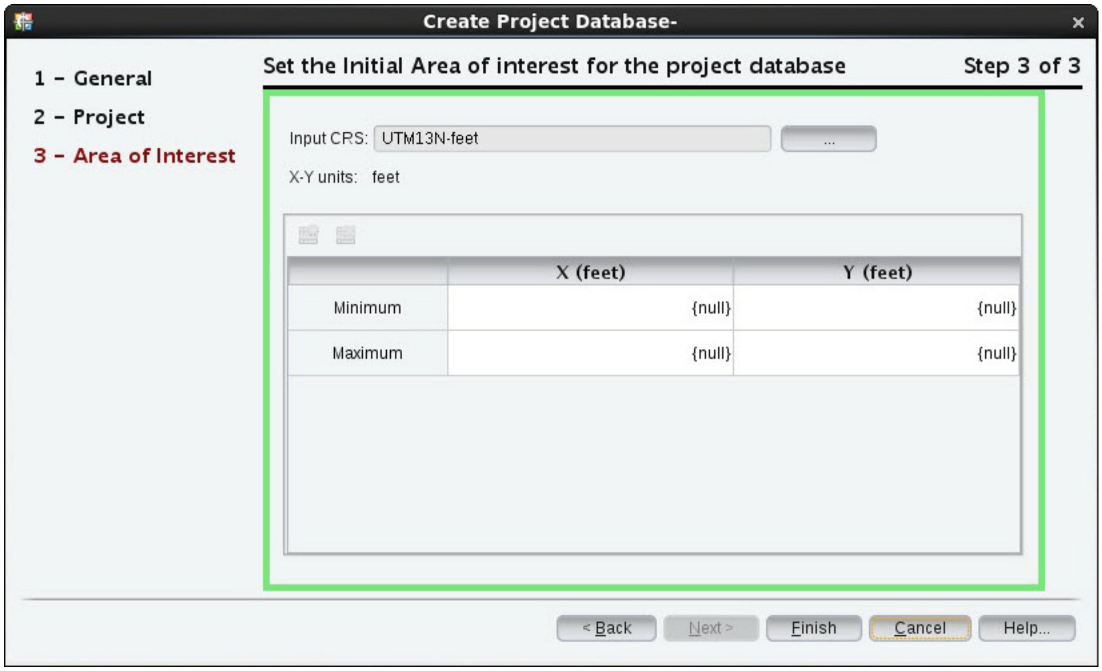
4. In the *Create Project Database* window, set the default Cartographic Reference field to **UTM13N-feet**.

5. Define the other **Project Create** variables as shown in the images below.

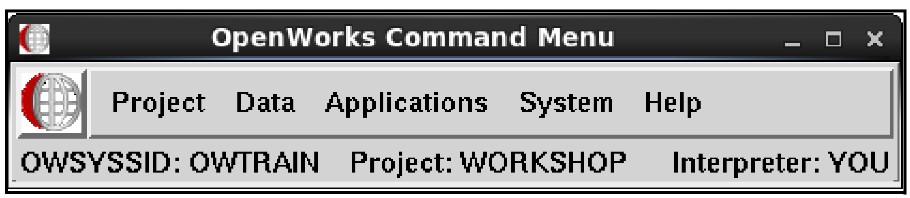
6. To create the project, click **Finish** in the third step of the Create Project Database Wizard. After you have created the project, click **Close**.







7. To select the **WORKSHOP** project using the Project Status Tool, select **Project > Interpretation ID Manager** to add yourself as an Interpreter.



Loading Well Data

In this portion of the exercise, you load well header information. You also have the option of choosing additional well test, completion, core, dip meter, pick, and other data. (Refer to Chapter 3 as needed.)

1. Review the following input well files using Unix system commands. You may need to ask your instructor where they are stored on your system. Determine which files contain depth measurements in meters, and which contain depth measurements in feet. Also note how each file reports depth: MD, TVD, or TVDSS.

Input Well Data Files
well40.md.ft
well42.sstvd.mtr
well38a.sstvd.ft
well38.sstvd.ft
well41.tvd.mtr
well41a.tvd.ft
well43.md.mtr

   Can you use the same format for each of the seven files?
   If you think you can, make sure that you define your format definitions so that they will accommodate all of the files.
   (**Hint**: Watch for changing field lengths.)

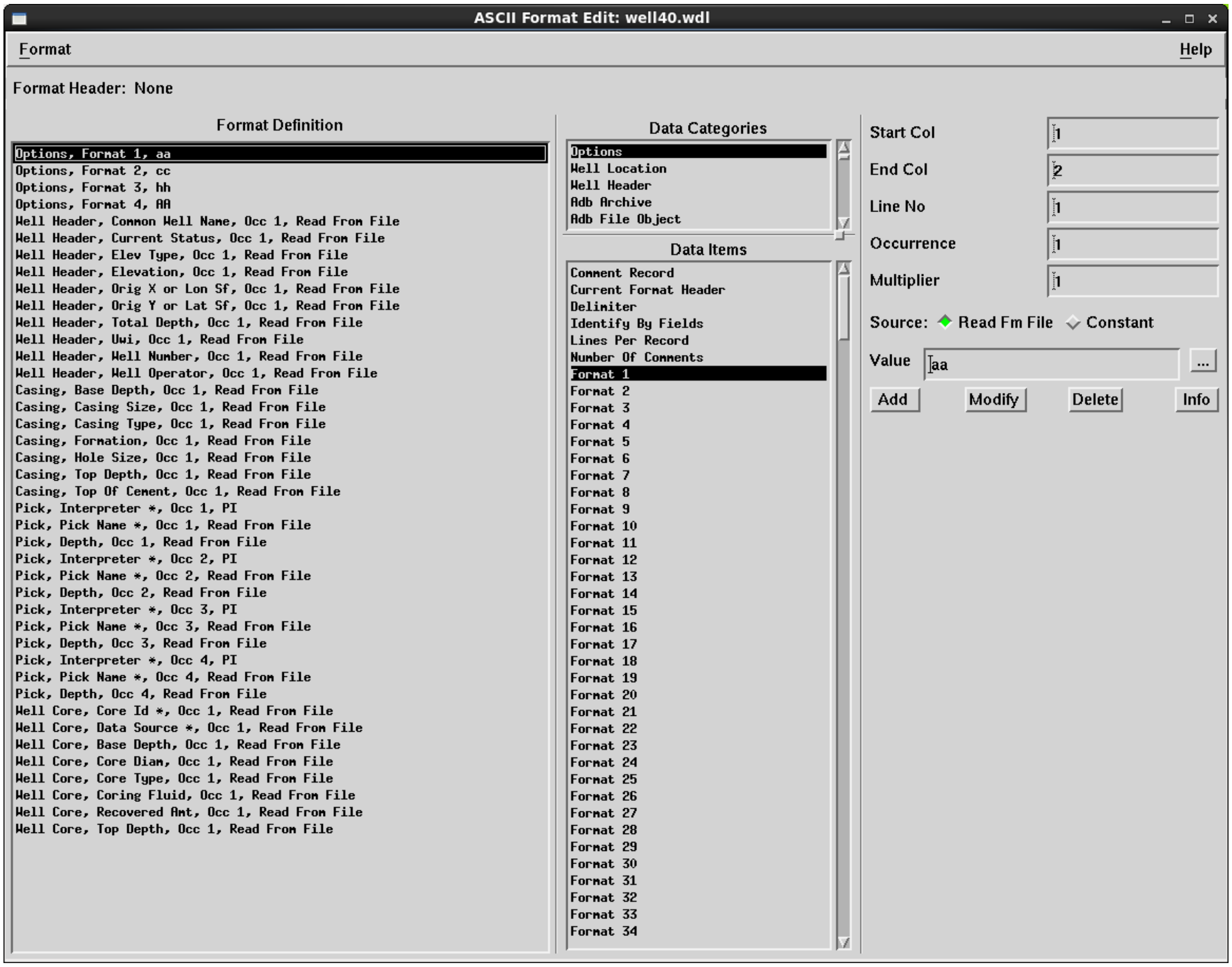
2. Use the ASCII Loader, starting with the data file **well40.md.ft**, to build a format file that loads the following fields:

Data Category	Data Item	Start Col	End Col	Other
Options	Format 1 Format 2 Format 3 Format 4	1 1 1 1	2 2 2 2	highlight: **aa** highlight: **cc** highlight: **hh** highlight: **AA**

Data Category	Data Item	Start Col	End Col	Other
Well Header	UWI Common Name Current Status Elev Type Elevation Orig X Sf Orig Y Sf Total Depth Well Number Well Operator	24 22 55 15 33 8 24 47 70 63	29 46 59 16 36 15 32 53 74 75	format flag = aa
Casing	Base Depth Top Depth Casing Size Casing Type Formation Hole Size Top of Cement	50 34 16 36 15 35 59	58 36 22 42 21 39 68	format flag = cc
Well Core	Core ID Data Source Base Depth Core Diam Core Type Coring Fluid Recovered Amt Top Depth	51 81 58 18 33 81 20 36	57 84 66 23 39 87 25 44	format flag = hh
Pick	Interpreter Pick Name Depth Interpreter Pick Name Depth Interpreter Pick Name Depth Interpreter Pick Name Depth	constant 11 18 constant 30 38 constant 50 57 constant 69 77	PI 16 25 PI 36 45 PI 55 64 PI 75 84	format flag = AA occurrence = 2 occurrence = 3 occurrence = 4

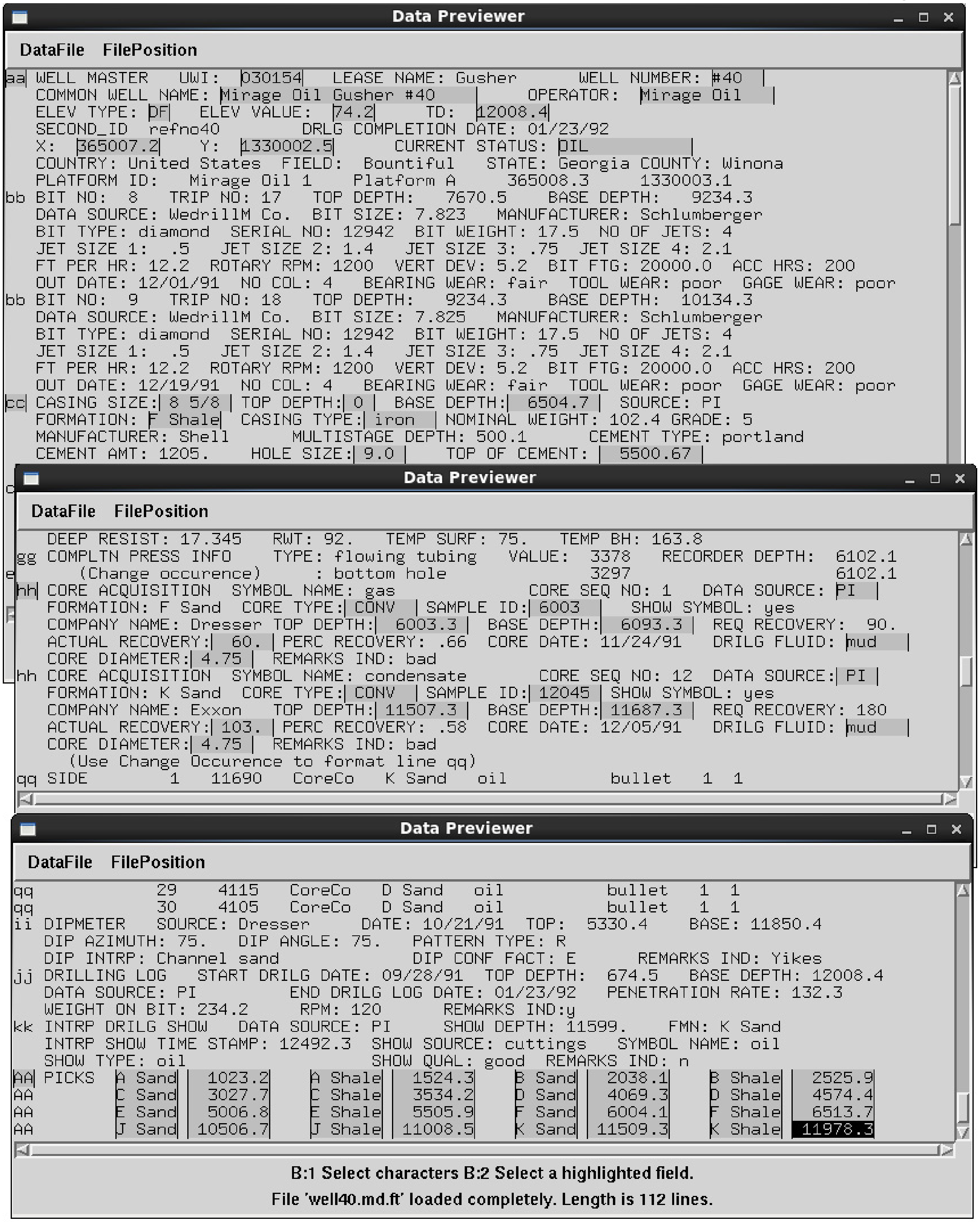
The completed Data Previewer and format definitions are shown on the following pages.

Your Format Definitions should look like the following:



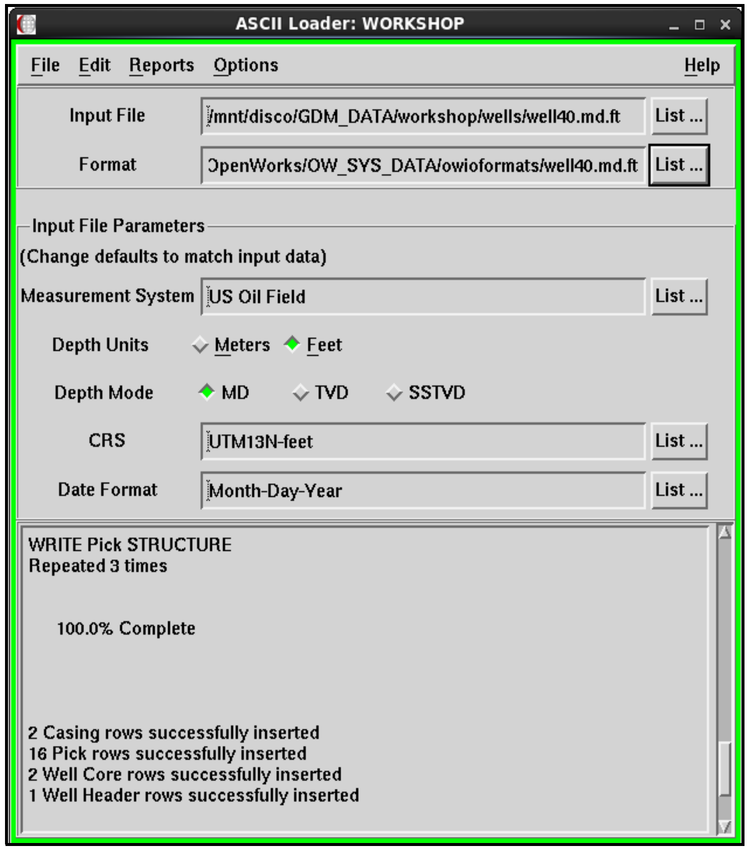
3. **Save** and **Test** the format.

Your Data Previewer window should look like the following:



4. As you scroll through the Data Previewer, look for any truncated fields that indicate there is a problem with your format definitions. **Stop** and **Close** the test.

5. At the ASCII Loader main window, make sure the correct **File** and **Format** are selected, that **US Oil Field** is the measurement system, that Depth Units are **Feet**, and Depth Mode is **MD**.



6. **Load** the data.

7. Open the Well Data Manager to verify that entries were made to the **Well Header**, **Surface Picks, Casing**, and **Core** forms.

8. In the ASCII Loader, open the data file **well41.tvd.mtr** with the format file you just used.

9. **Test** the format, and scroll through the Data Previewer, looking for truncated fields.

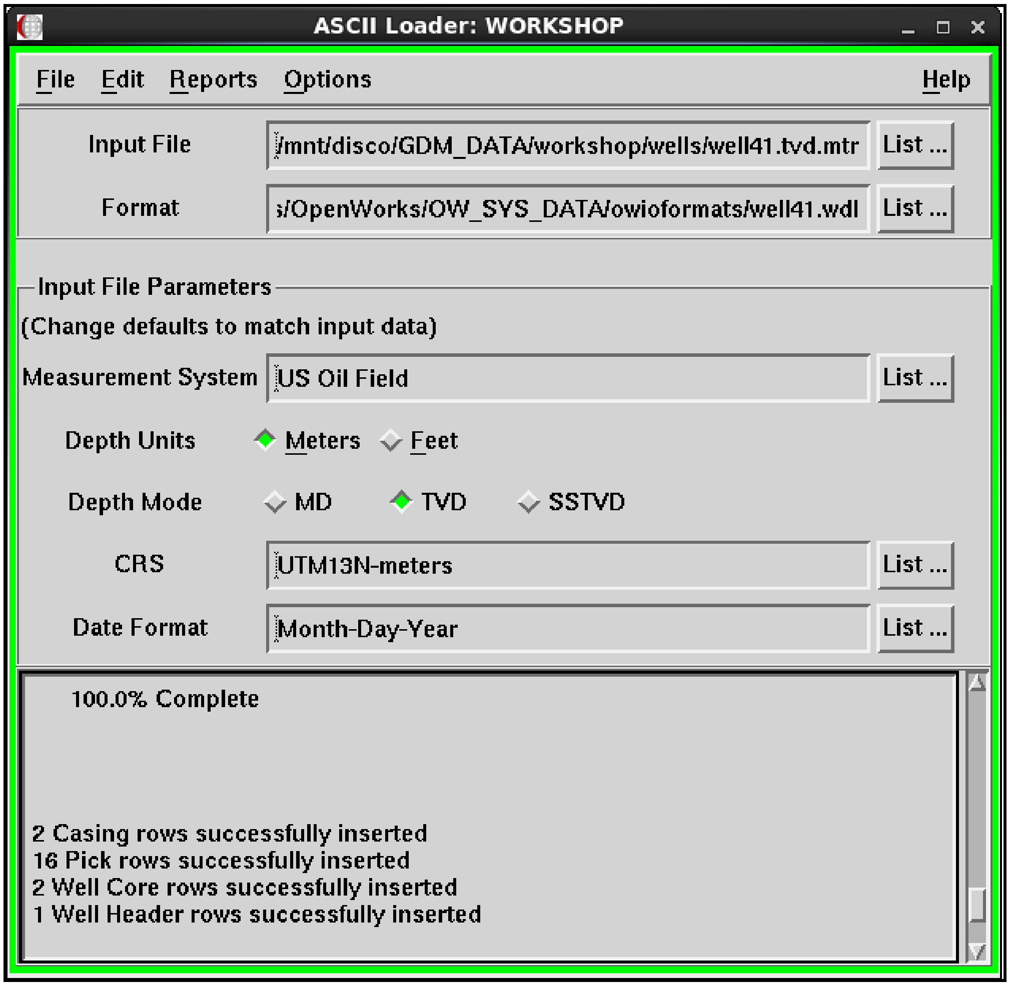
10. **Modify** any improperly formatted fields you find.

    If you built your format file correctly for the previous well, you should not find any problems.

11. **Stop** and **Close** the test.

12. On the ASCII Loader main window, make sure the correct **File** and **Format** are selected, that **US Oil Field** is the measurement system, that Depth Units are **Meters**, and Depth Mode is **TVD**.

    Change the **CRS** to **UTM13N-meters** to account for distances (specifically X and Y) in meters.

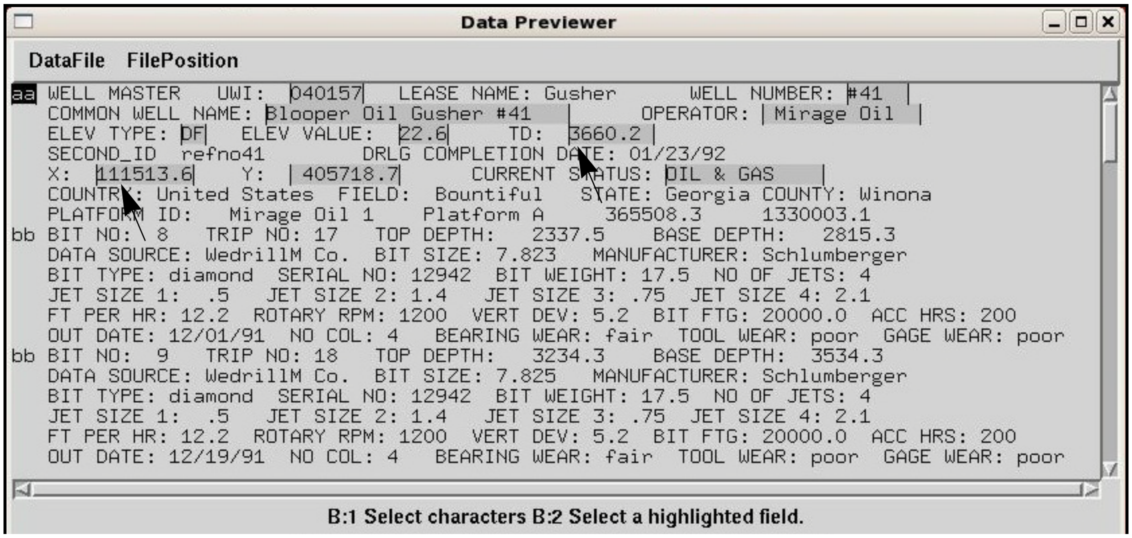


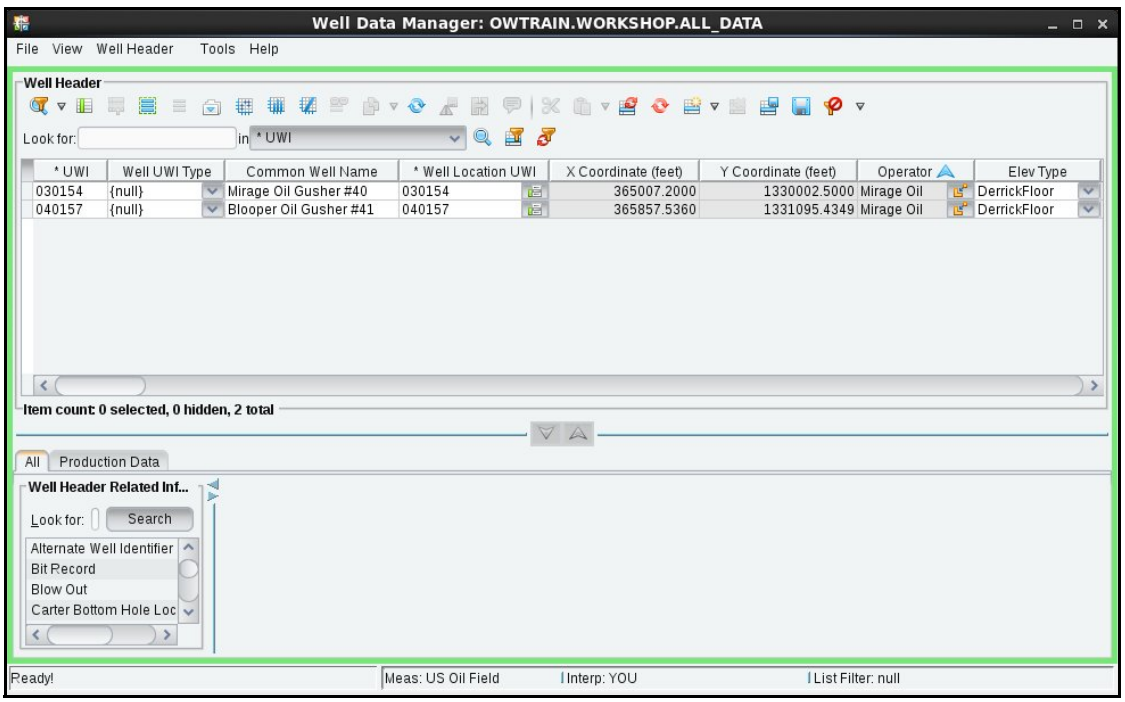
13. **Load** the data.

14. Open the Well Data Manager (use **File** to select the default Well List) to verify that entries were made to the **Well Header**, **Surface Picks**, **Casing**, and **Core** forms.

    Notice that values imported as meters were converted to feet for storage. This is because when the project was created, you set the project CRS to **UTM13-feet**, and the measurement system to **US Oil Field**.

Examples of the conversions are shown below.





Notice that in the original data file, X, Y, Elevation, TD, etc, are all recorded in meters, but once imported, the Well Data Manager shows these quantities stored in feet.

15. In the ASCII Loader, open the data file **well41a.tvd.ft** with the format file you just used.

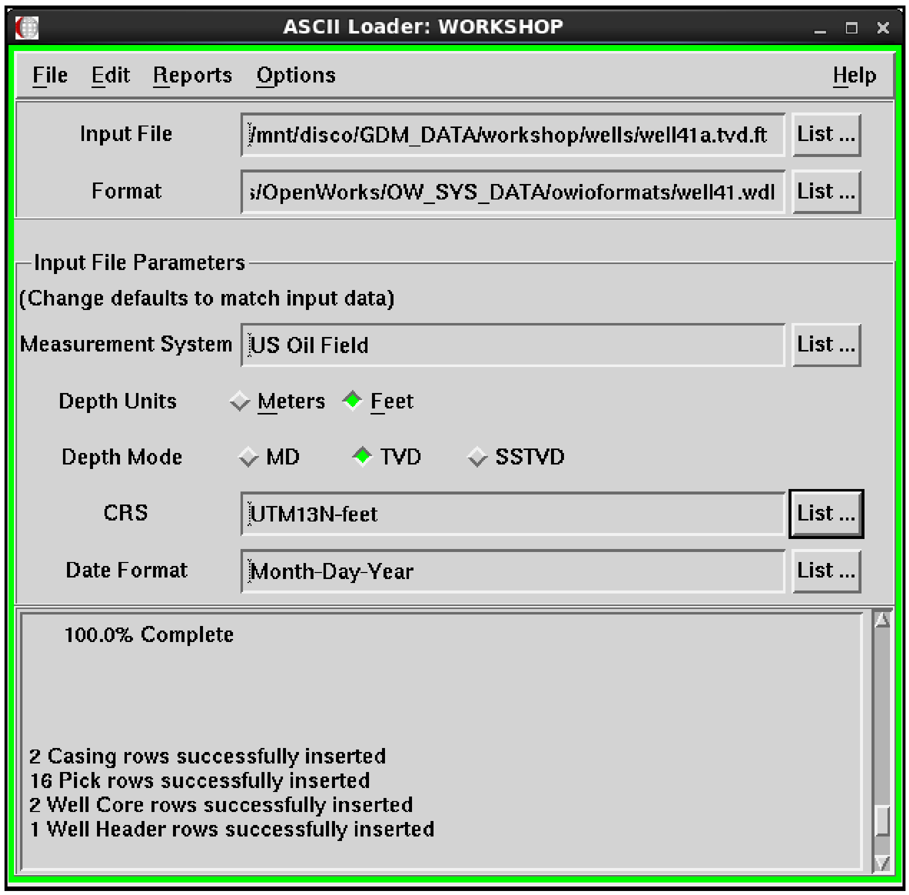
16. **Test** the format, and again, scroll through the Data Previewer, looking for truncated fields.

17. **Modify** any improperly formatted fields you find.

    Again, if you built your format file correctly for the previous wells, you should not find any problems.

18. **Stop** and **Close** the test.

19. On the ASCII Loader main window, make sure the correct **File** and **Format** are selected, that **US Oil Field** is the measurement system, that Depth Units are **Feet**, and Depth Mode is **TVD.** Change the **CRS** to **UTM13N-feet** to account for distances (X and Y) in feet.



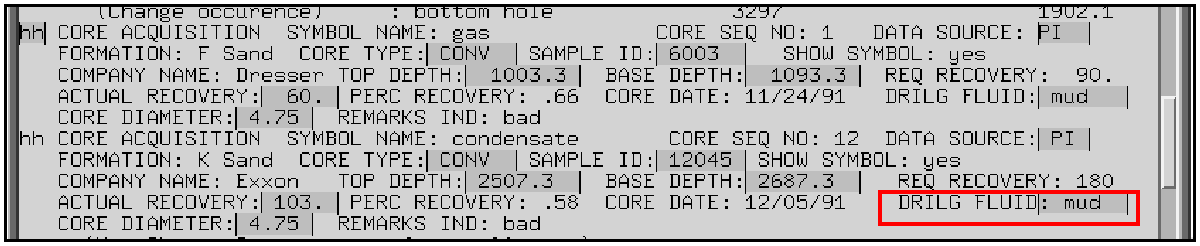
20. **Load** the data.

21. Use the Well Data Manager **File** option to re-select the default Well List and verify that entries were made to the **Well Header, Surface Pick**, **Casing**, and **Core** forms.

22. In the ASCII Loader, open the data file **well43.md.mtr** with the format file you just used.

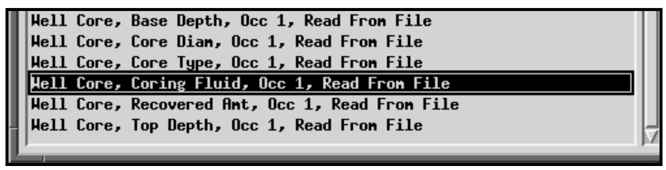
23. **Test** the format, and again, scroll through the Data Previewer, looking for truncated fields.

    Notice the **DRILG FLUID** entry for the second “hh” record. Instead of being formatted to read **mud**, it reads **:mud**, as shown here.

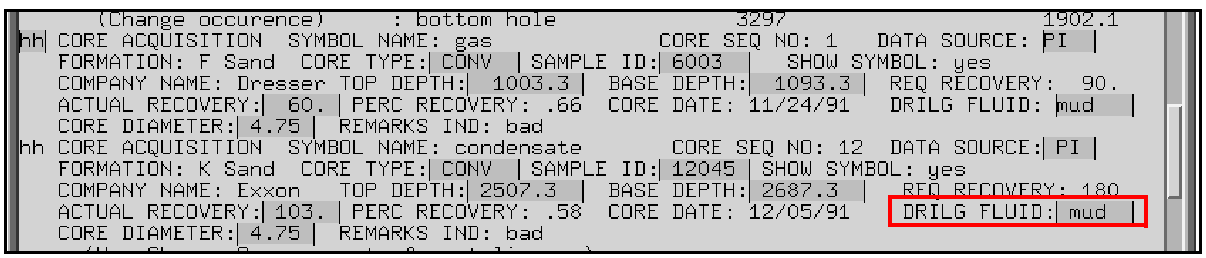


24. **Stop** and **Close** this test.

25. Highlight the **Coring Fluid** record in the Format Definition field. Reformat the field correctly (columns 82 to 87), and click **Modify**.



26. **Save** the format, and run the Test again.



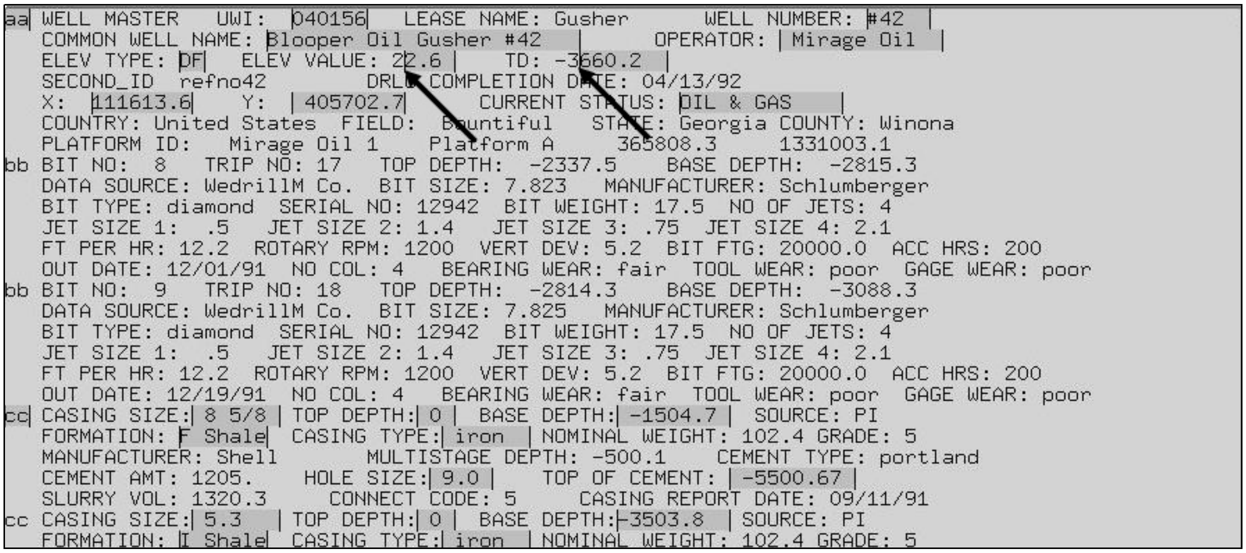
27. On the ASCII Loader main window, make sure the correct **File** and **Format** are selected, that **US Oil Field** is the measurement system, that Depth Units are **Meters**, and Depth Mode is **MD.** Change the **CRS** to **UTM13N-meters**.

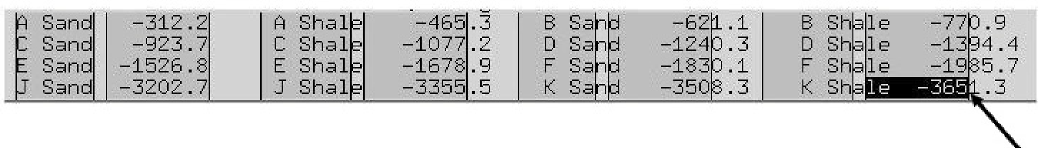
28. **Load** the data. Verify it with Well Data Manager.

29. In the ASCII Loader, open the data file **well42.sstvd.mtr** with the format file you just used.

30. **Test** the format, and again, scroll through the Data Previewer, looking for truncated fields.

Notice that many fields are improperly formatted.
For example: ELEV VALUE, TD, and most of the Pick Names and Depths.





31. Highlight the appropriate records in the Format Definition field, reformat each field correctly, and click **Modify**.

32. **Save** and **Test** the format. Scroll through the Data Previewer again, looking for any truncated fields you missed. **Stop** and **Close** the test. Make any additional needed corrections. Test again.

33. On the ASCII Loader main window, make sure the correct **File** and **Format** are selected, that **US Oil Field** is the measurement system, that Depth Units are **Meters**, and Depth Mode is **SSTVD**.
    Make sure the **CRS** to **UTM13N-meters**.

34. **Load** the data. Verify it with Well Data Manager.

35. In the ASCII Loader, open the data file **well38a.sstvd.ft** with the format file you just used.

36. **Test** the format, and again, scroll through the Data Previewer, looking for truncated fields.

    If anything, you'll need to reformat the Pick Names and Depths.

37. When the format is correct, tested, and saved, load the data.

    Make sure the correct **File** and **Format** are selected, that **US Oil Field** is the measurement system, that Depth Units are **Feet**, and Depth Mode is **SSTVD**. Change the **CRS** to **UTM13N-feet**.

38. Use the Well Data Manager **File** option to reselect the default Well List and verify the entries made to the **Well Header**, **Surface Pick**, **Casing**, and **Core** forms.

39. In the ASCII Loader, open the data file **well38.sstvd.ft** with the format file you just used.

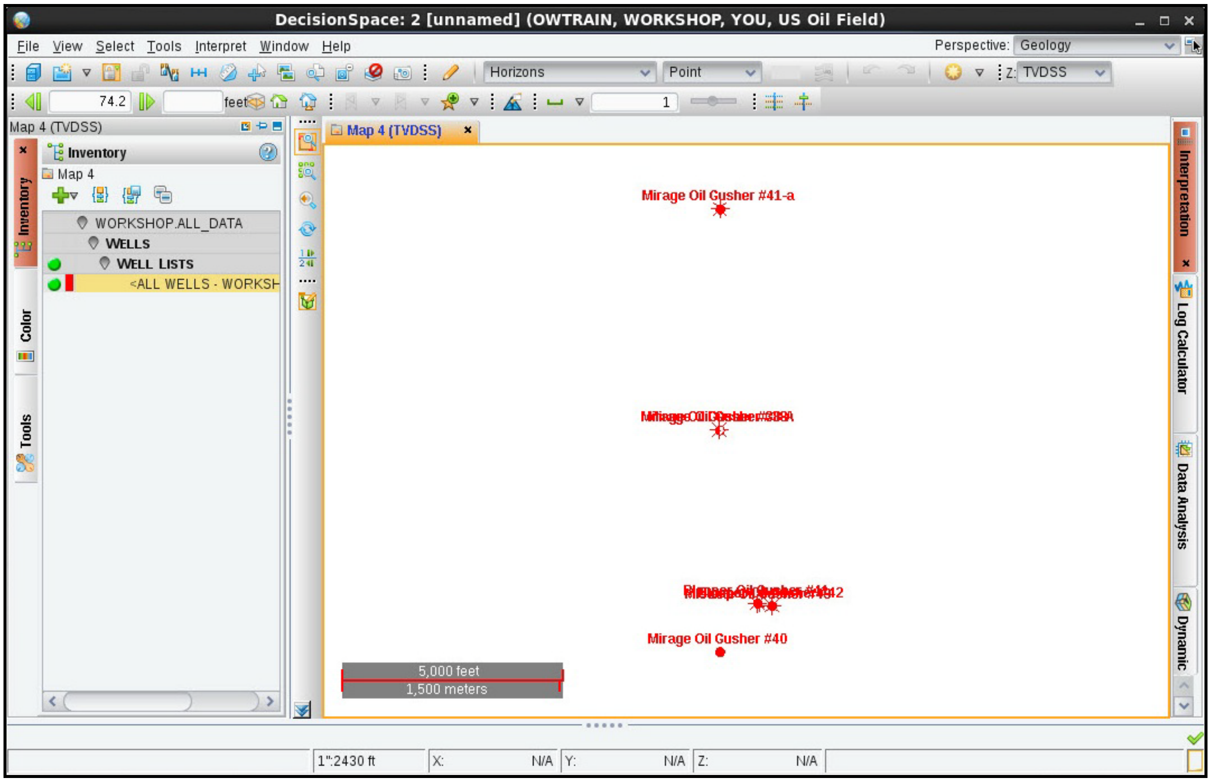
40. **Test** the format, and again, scroll through the Data Previewer, looking for truncated fields.

41. When the format is correct, tested, and saved, load the data.

    Make sure the correct **File** and **Format** are selected, that **US Oil Field** is the measurement system, that Depth Units are **Feet**, and Depth Mode is **SSTVD**. Change the **CRS** to **UTM13N-feet**.

42. Again, use the Well Data Manager **File** option to re-select the default Well List and verify the entries made to the **Well Header**, **Pick**, **Casing**, and **Well Core** forms.

43. Open DecisionSpace Geosciences (from the OpenWorks command line, select **Applications > DecisionSpace Geosciences**) and display the wells in a Map view.



44. Leave DecisionSpace Geosciences and Well Data Manager open. In the next section of this workshop you load position log data.

Loading Position Logs

Five of the wells that you are working with are deviated. In this section of the workshop you load the position log data for these wells. (Refer to Chapter 4 as needed.)

1. Use the **Curve Loader** to load the following ASCII position log files. You may need to ask your instructor where they are stored on your system. Determine which files contain depth measurements in meters, and which contain depth measurements in feet. Also know how each file reports depth: TVD or TVDSS.

ASCII Position Log Files
poslog41.tvd.mtr
poslog42.tvdss.mtr
poslog38-A.tvdss.ft
poslog38.tvdss.ft
poslog41a.tvd.ft

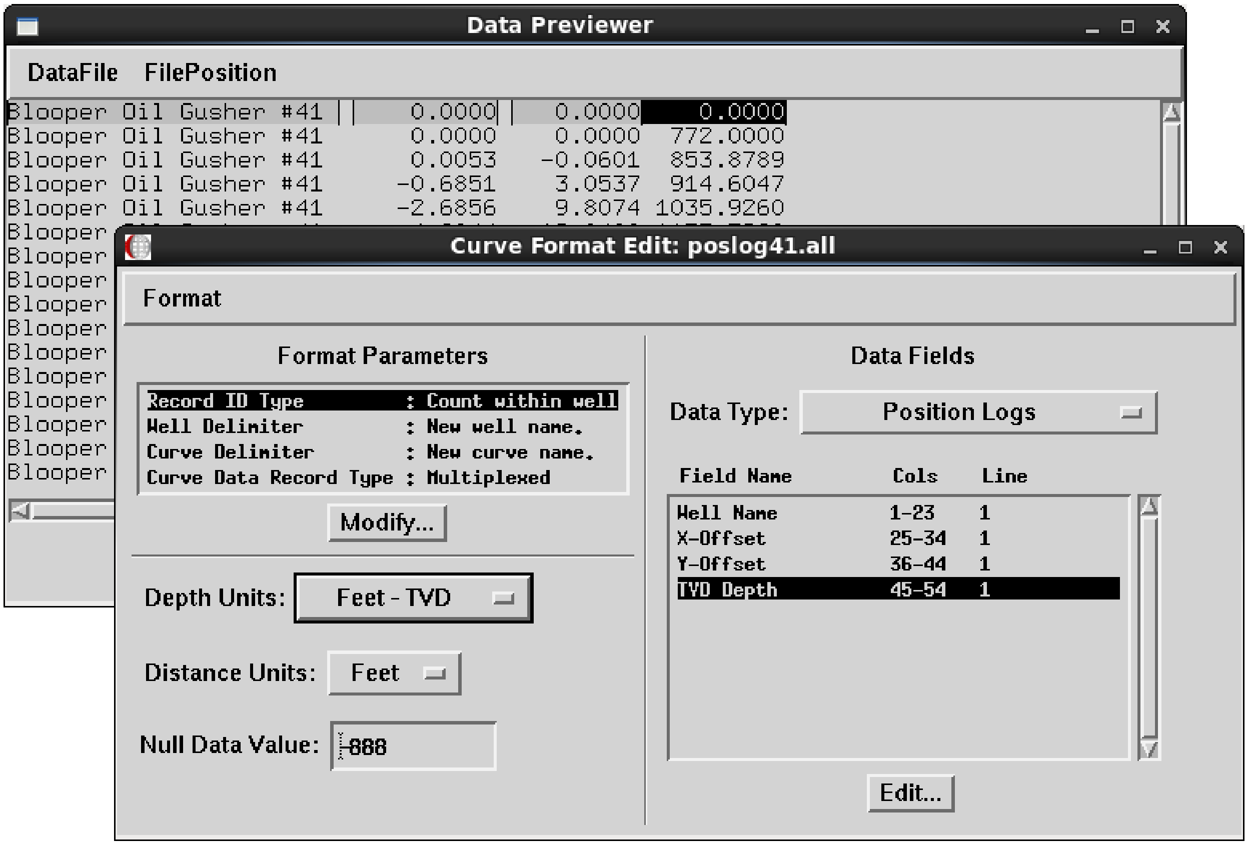
Can you use the same format for each of the file files?
If you think you can, make sure that you define your format definitions so that they will accommodate all of the files.

Hint
Watch for changes in field lengths.

2. Use **Edit > ASCII Format** to build a new format file and load the following fields in the file **poslog41.tvd.mtr**.

Field Name	Start Col	End Col
Common Well Name	1	23
X Offset	25	34
Y Offset	36	44
TVD Depth	45	54

The Data Previewer and Curve Format Edit windows should look much like what is shown here.



Once you build and save this format file, can you use the same one for each file? If not, can you use the same one with modifications? Which aspects of the format will you modify?

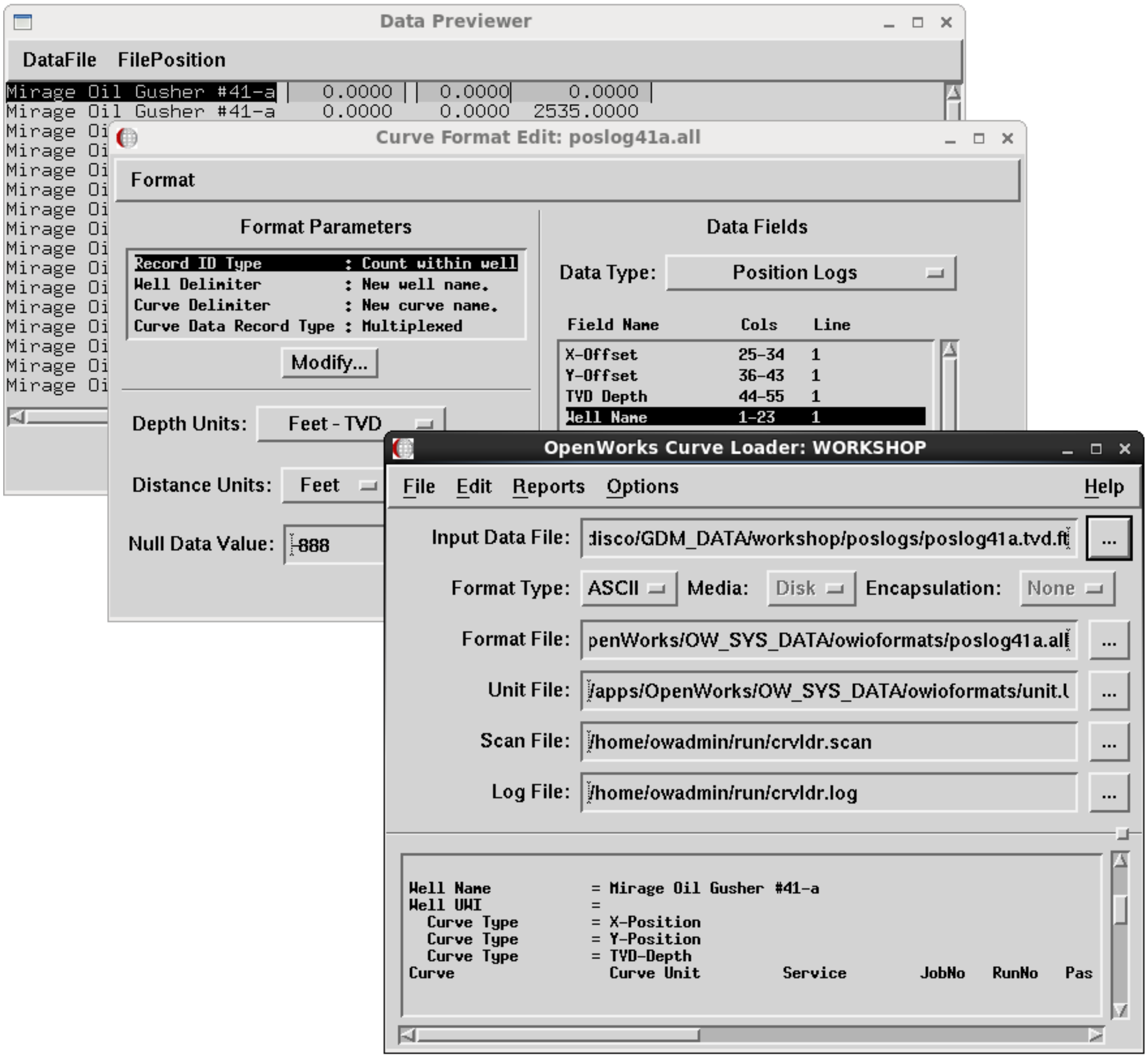
Hint

Watch out for changes in Depth Units and Distance Units. Also, make sure that your Data Fields are the correct length.

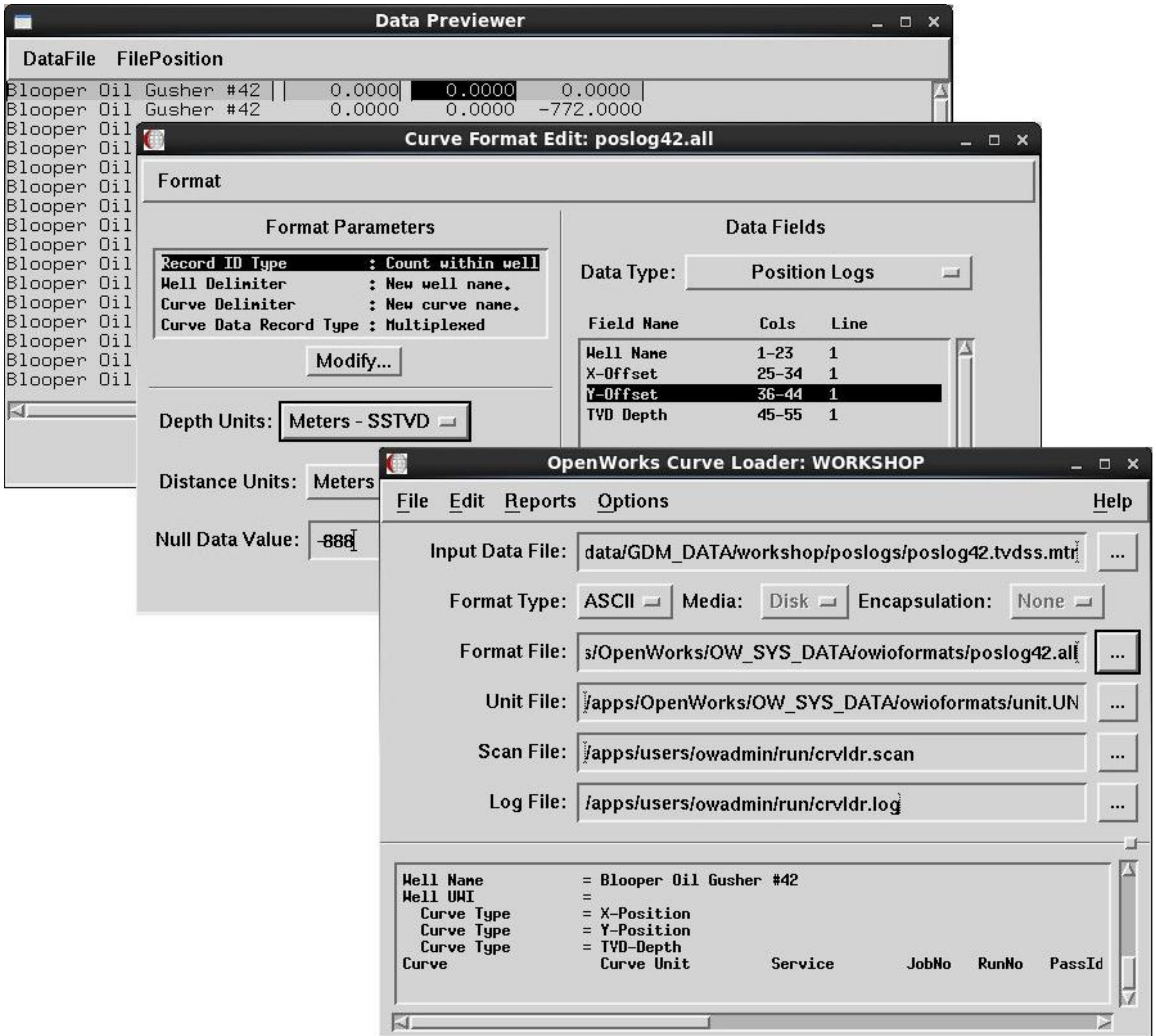
3. **Save**, **Scan**, and **Load**. (Drop invalid well names, but add invalid curve names to the Curve Dictionary. Load data as Composite.)

   Import the remaining position log files for the workshop, starting with **poslog41a.tvd.ft**.

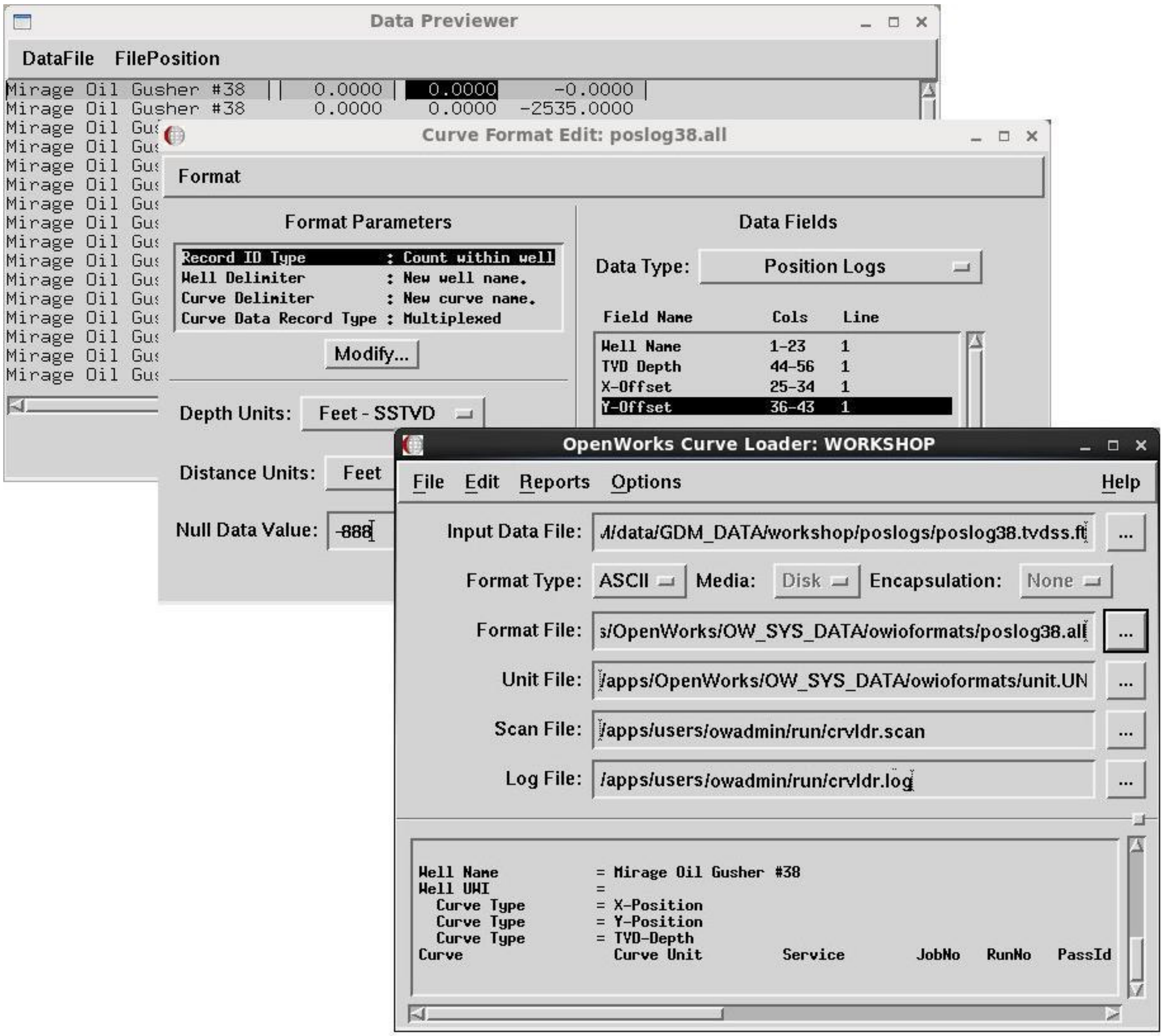
Remember to change the **Depth Units** and **Distance Units** as necessary on the Curve Format Edit dialog box.



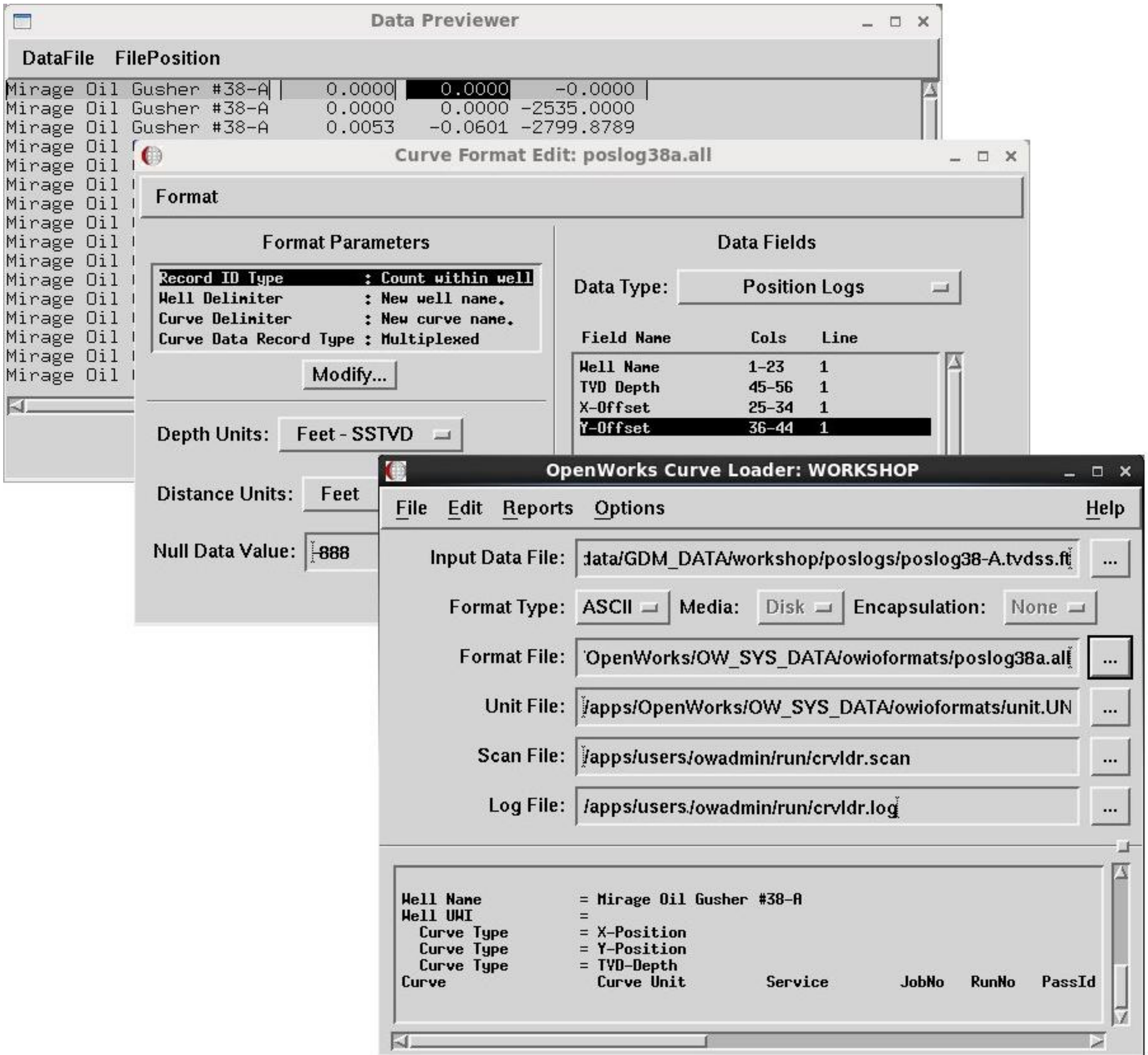
4. Import the file named **poslog42.tvdss.mtr**.



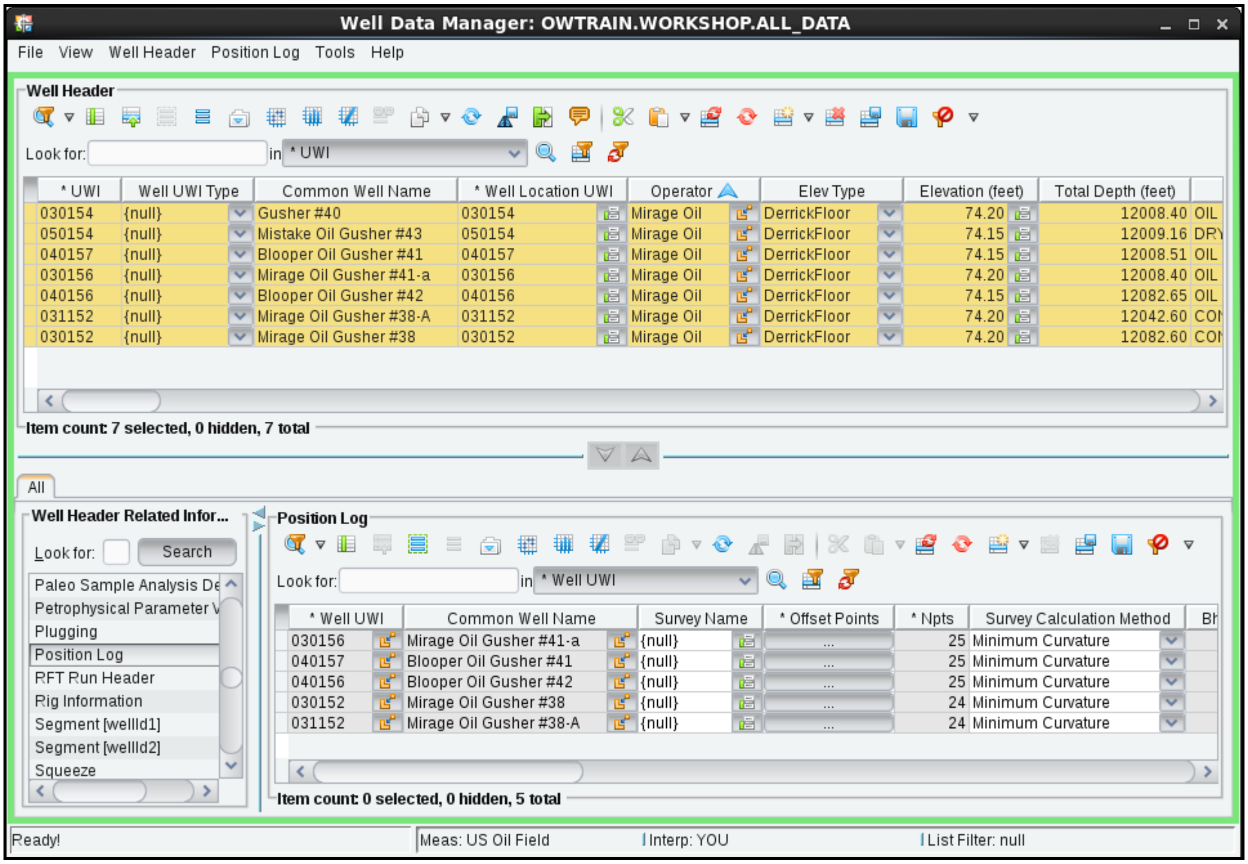
5. Import the file named **poslog38.tvdss.ft**



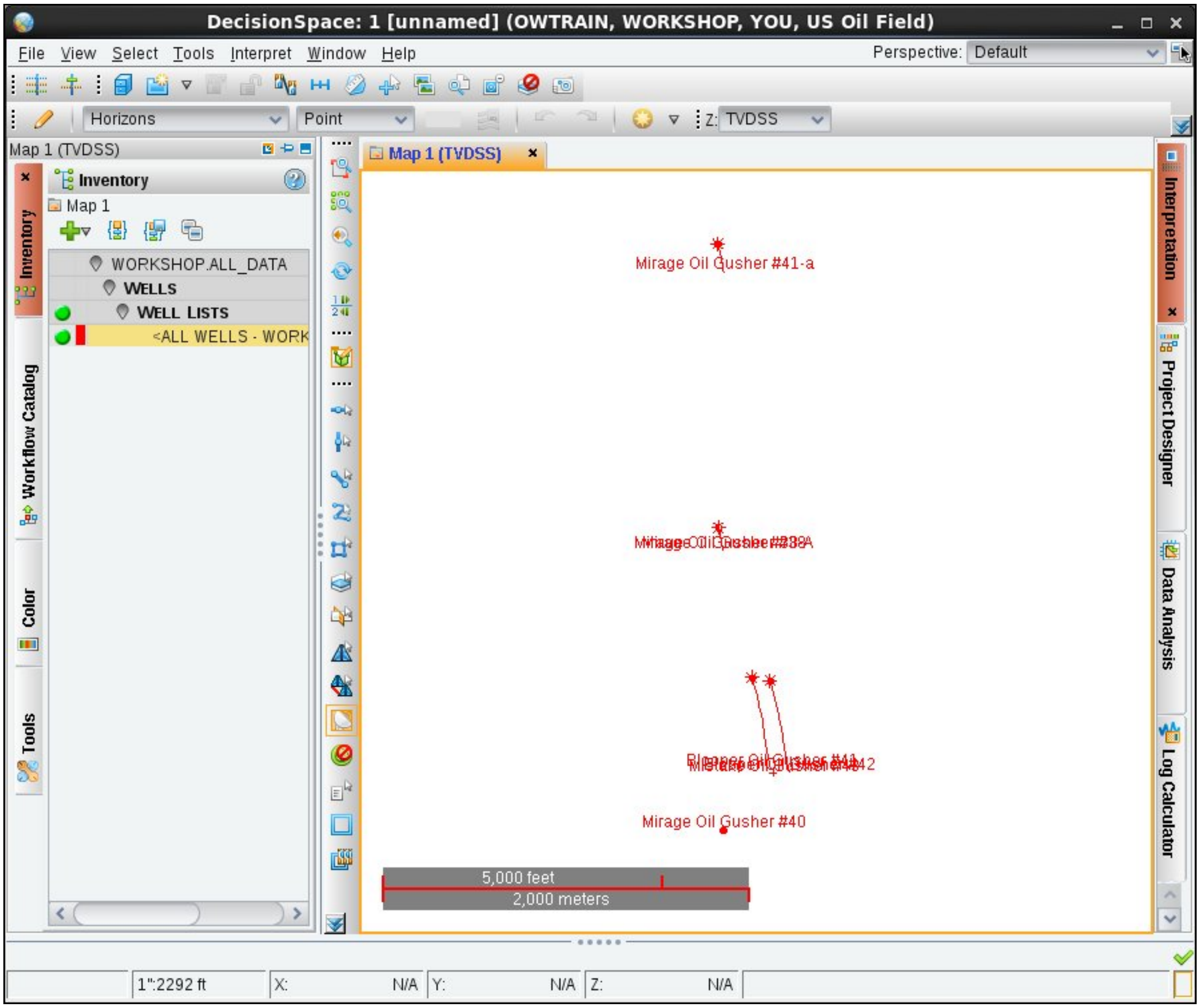
6. Import the file named **poslog38-A.tvdss.ft**.



7. Use Well Data Manager to verify the position logs once they are loaded.



8. In DecisionSpace Geosciences, update the display to see the deviated wells by selecting **View > Reload Wells**.



Loading Well Log Curves

In this portion of the workshop, you load log curve data for the existing wells in your project. You work with both ASCII formatted data as well as binary formatted LIS data. You also use the **Add** option in **Load Select** to add a well to your project. (Refer to chapters 4 and 6 as needed.)

Begin by loading the ASCII curve data.

1. Use the **Curve Loader** to load the following ASCII well log curve files. (You may need to ask your instructor where they are stored on your system.)

   Determine which files contain depth measurements in meters, and which contain depth measurements in feet. Also know how each file reports depth: MD, TVD, or TVDSS.

ASCII Log Curve Files
curves41.tvd.mtr
curves42.sstvd.mtr
curves38-A.sstvd.ft
curves38.sstvd.ft
curves40.md.ft
curves41-A.tvd.ft

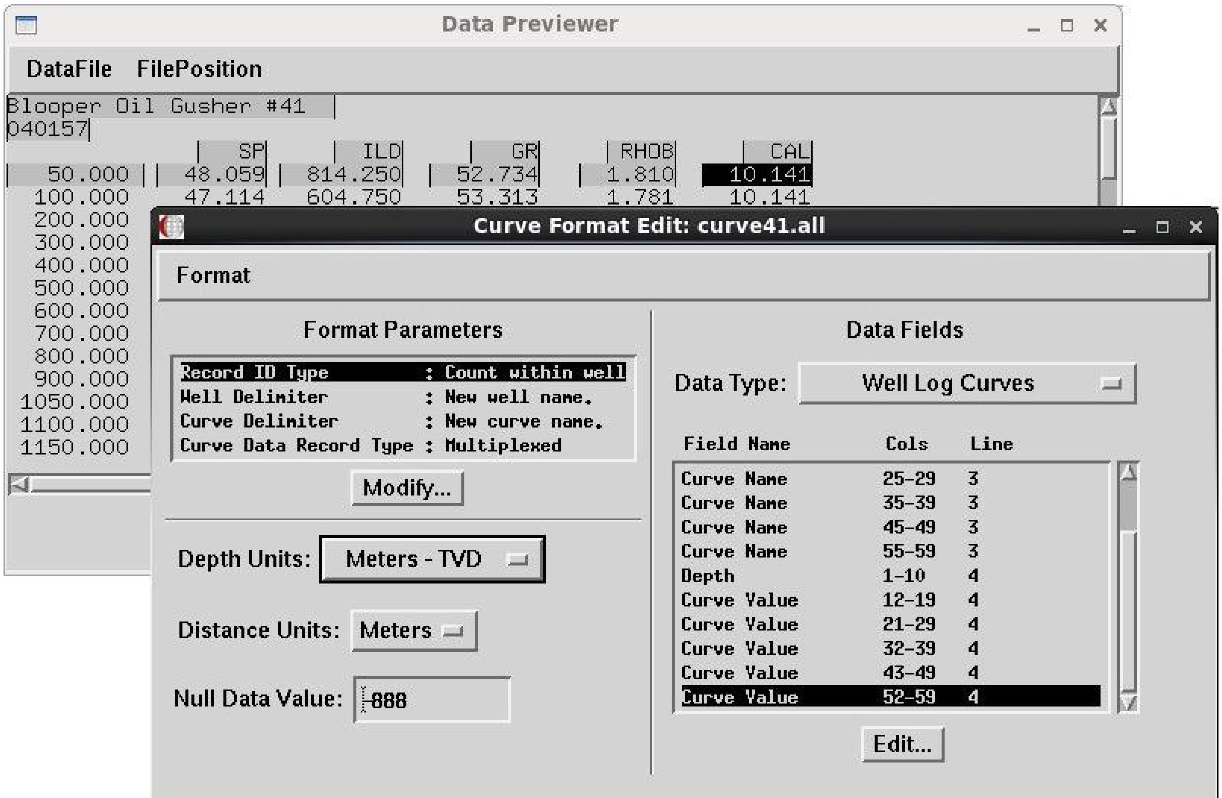
   Can you use the same format for each of the file files?

2. Use **Edit > ASCII Format** to build a new format file and load the following fields in the file **curves41.tvd.mtr**.

Field Name	Start Col	End Col	Line 1
Common Well Name	1	24	1
UWI	1	6	2
Curve Name	15	19	3
Curve Name	25	29	3

Field Name	Start Col	End Col	Line 1
Curve Name	35	39	3
Curve Name	45	49	3
Curve Name	55	59	3
Depth of Measurement	1	10	4
Curve Value	12	19	4
Curve Value	21	29	4
Curve Value	32	39	4
Curve Value	43	49	4
Curve Value	52	59	4

Your Data Previewer and Curve Format Edit windows should look similar to what is shown here.



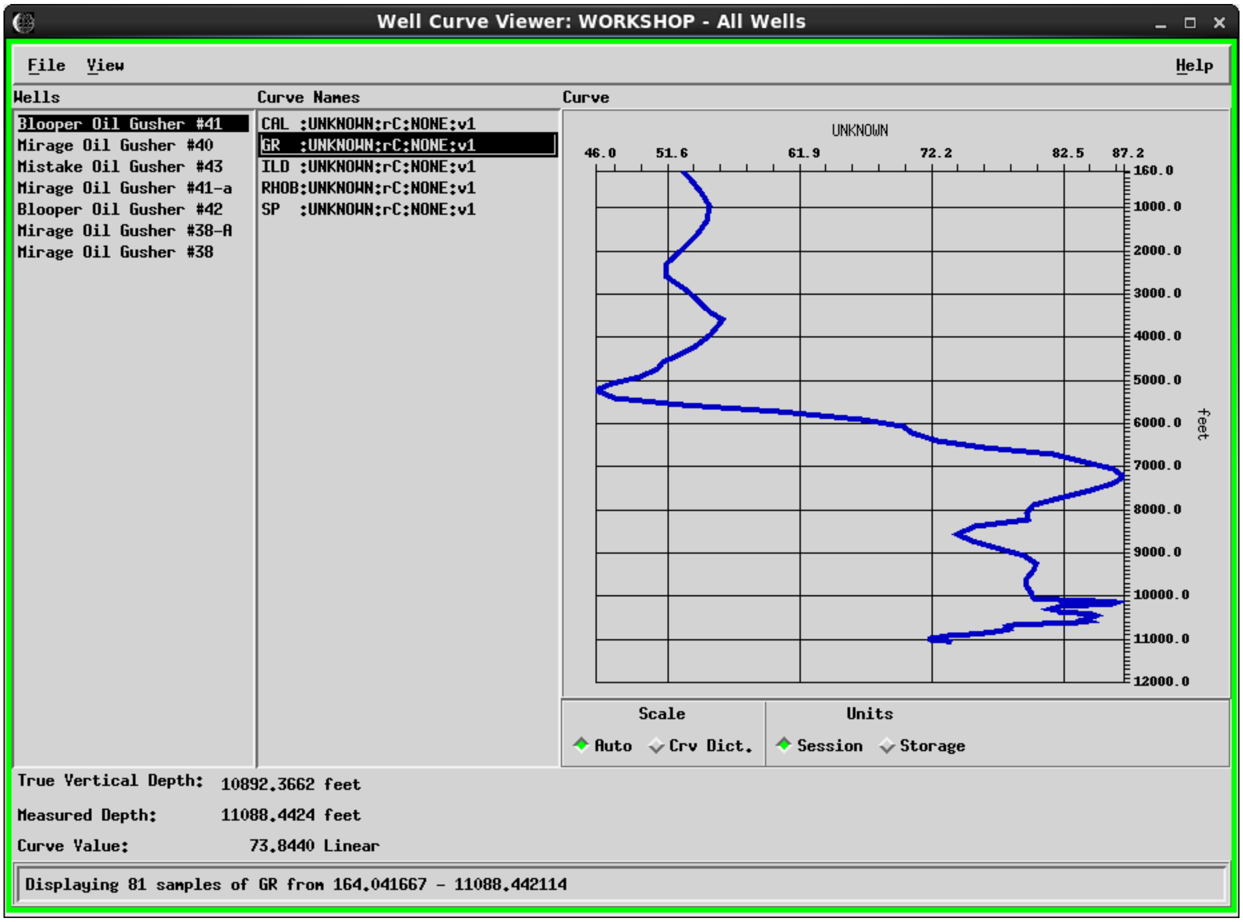
Once you build and save this format file, can you use the same one for each file? If not, can you use the same one with modifications? Which aspects of the format will you modify?

> **Hint**
>
> Watch out for changes in Depth Units and Distance Units. Also, make sure that your Data Fields are the correct length.

3. **Save**, **Scan**, and **Load**.

   (Drop invalid well names, but add invalid curve names to the Curve Dictionary. Load data as **Processed/Composite**.)

4. Use the **Well Curve Viewer** to verify that five curves, each approximately 12,000 feet, were loaded to this well. (Refer to Chapter 4 as needed.)



5. Import the remaining log curve files for the workshop.

   Remember to change the **Depth** and **Distance** units as necessary on the Curve Format Edit dialog box.

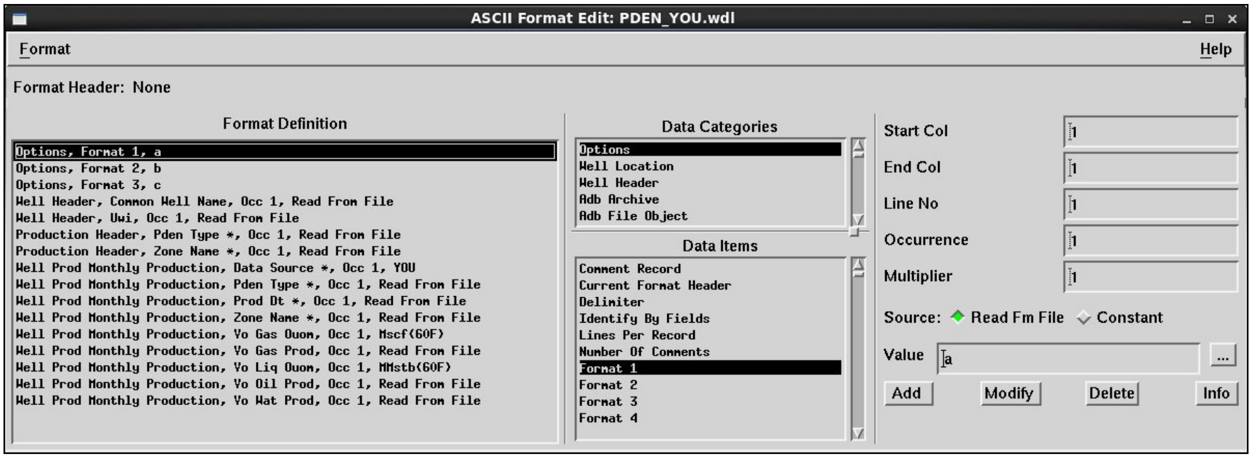
Loading Production Data

In this portion of the workshop you will load production data for a well that is *not* in your project. To load the data use the **PDEN_WKSHP.prn** data file. Name your format **PDEN_YOU.wdl**.

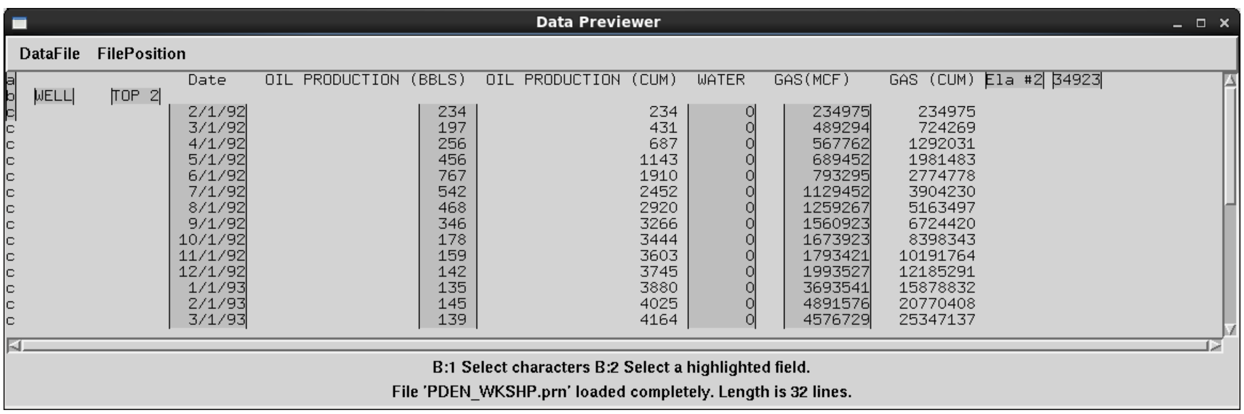
The following is a suggested format for loading production data.

Format Flag	Data Category	Data Item	Start Column	End Column
a	Options	Format 1	1	1
b		Format 2	1	1
c		Format 3	1	1
a	Well Header	Uwi, R	110	114
a		Common Well Name	103	108
b	Production Header	Pden Type *	4	7
b		Zone Name *	12	16
	Well Prod Monthly Production	Data Source *	Constant = “YOU”	
b		Pden Type *	4	7
c		Prod Dt *	18	25
b		Zone Name *FK	12	16
		Vo Liqu Ouom	Constant = “MMstb(60F)”	
c		Vo Oil Prod	44	49
c		Vo Wat Prod	72	78
		Vo Gas Ouom	Constant = “Mscf (60F)”	
c		Vo Gas Prod	82	90

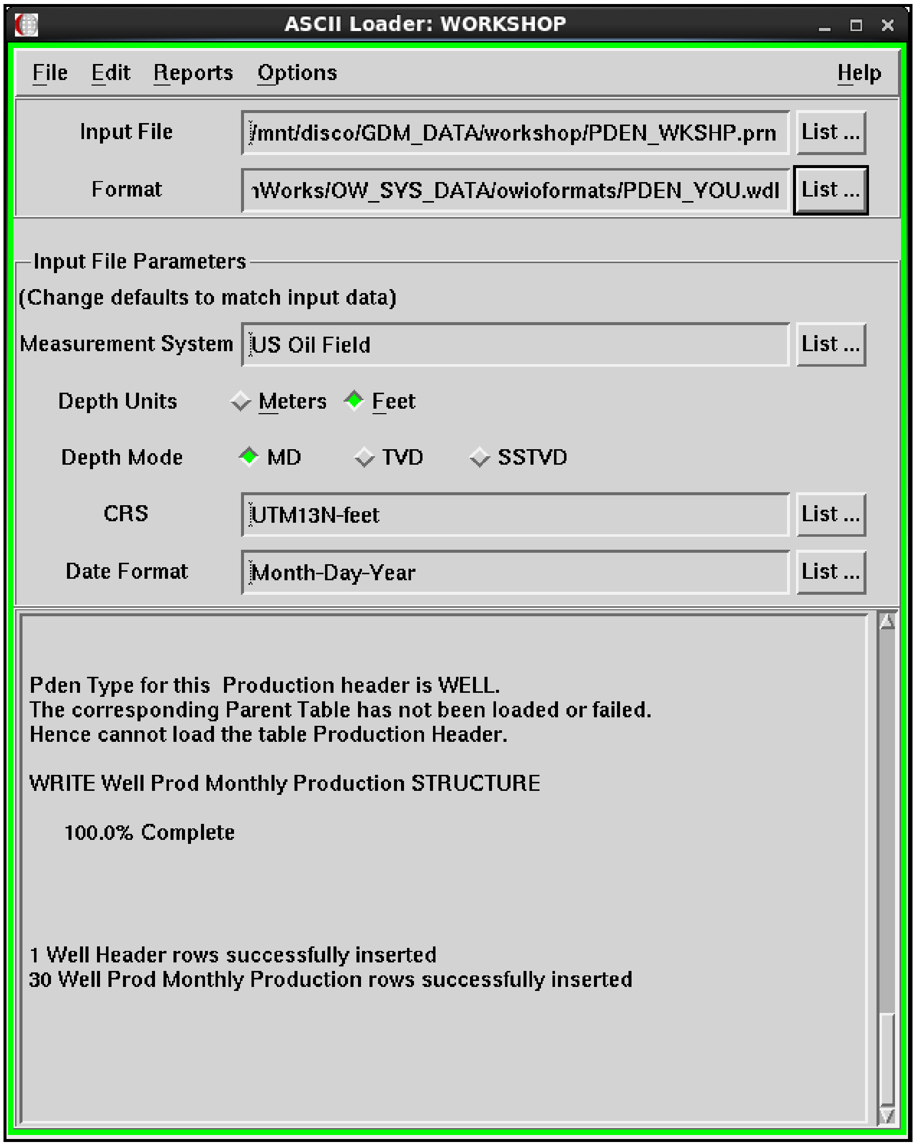
When you are finished creating the file, it should look like the the image shown here.



Format Test:

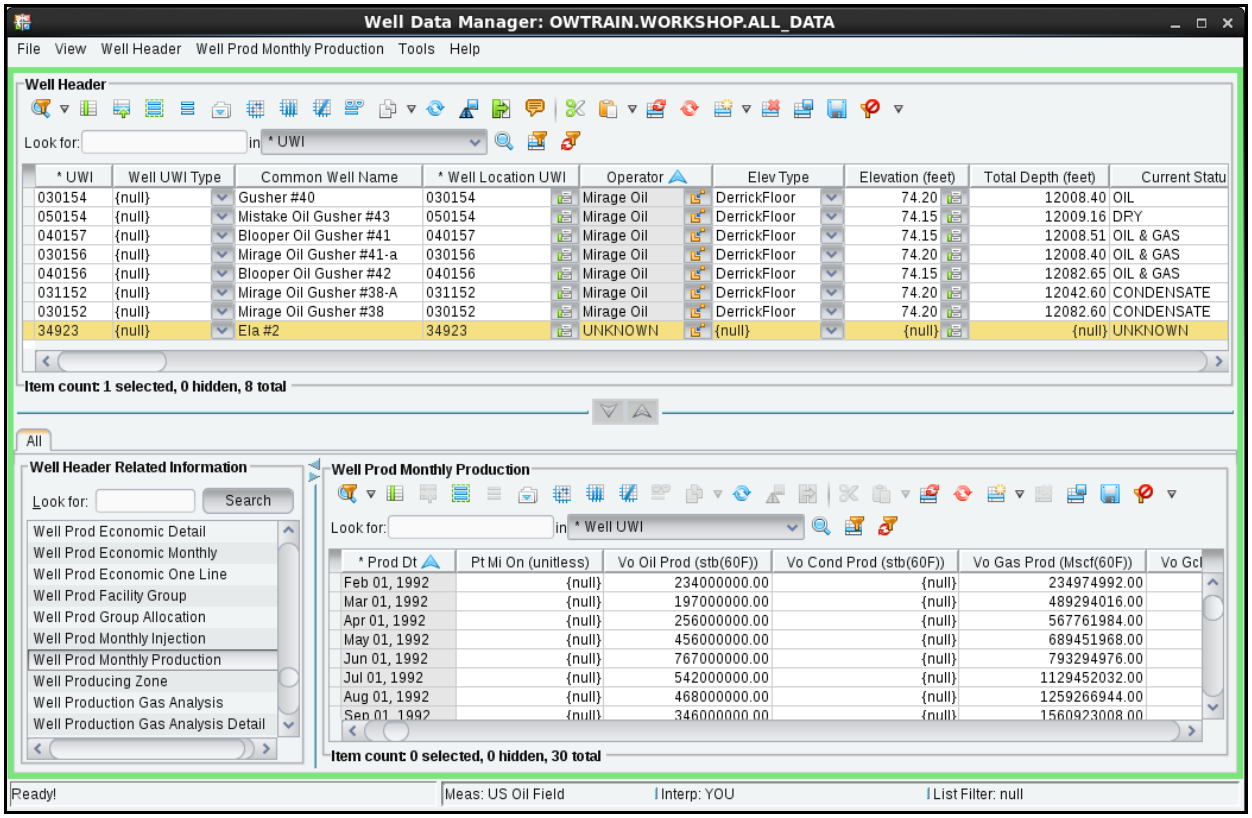


Load results:



6. **Save** and **Test** your data. **Load** the data file.

7. Use Well Data Manager to verify the load. Select **Production Monthly Production** in the Well Header Related Information list.



Congratulations! With your wells, curves, position logs, and production data loaded, you are now ready to begin your work in DecisionSpace Geosciences software or other Landmark applications.

Appendix **A**

Unix Command Reference

Introduction

The OpenWorks software allows you to create, open, and save most files from within dialog boxes. You simply select the appropriate dialog box options without specifying pathnames for the files. In this sense, the file structure is transparent to the user. This simplicity is useful in that it suppresses information that is not immediately relevant to the act of interpretation. It frees you to concentrate on interpreting the data without regard for how or where it is stored.

However, as you interpret data and work with projects, you will encounter situations that require you to know how to manipulate files at the system level. For example, you may need to obtain information about the size of a file, locate a file within the file system, or modify a file. Likewise, you may need to change the permissions assigned to a particular file or move a file from one directory to another. These are tasks that cannot be performed from within the OpenWorks dialog boxes. They must be performed from an xterm using one of the following types of file management tools.

- Unix commands
- Text editor

Unix Commands

The Unix system is an interactive operating system that allows computer resources to be shared by multiple users on a limited basis.

The following section provides a summary of some of the most useful Unix commands for managing your OpenWorks files and your system resources. A few of these commands may not work on your particular system, since different types of workstations use different versions of Unix. However, most Unix commands are common to all versions of Unix.

Most Unix workstations have an online manual that provides descriptions and parameters for the Unix commands available on the system. You can display the manual pages for a particular command by typing “man” followed by the command at the system prompt of an xterm.

The Unix commands[1] discussed in this section are grouped by the following tasks:

- Examining system resources
- Creating, displaying, and managing file directories
- Examining, manipulating, and printing files

> **Note**
>
> In the commands listed in this chapter, an item enclosed in brackets [ ] is optional. You can omit it if you wish. An item enclosed in < > is a variable which you supply. For example, <*filename*> means to insert the name of a specific file.

1. Most of the information about these commands has been derived from the Unix man pages for the Sun Release 4.1 or from the *AT&T Unix System V User's Guide* published by Prentice-Hall, Inc., Englewood Cliffs, NJ 07632.

Wildcard Symbols

Most Unix commands can be used with wildcard symbols that represent one or more unknown characters. These symbols are useful for managing multiple files with common character strings or for locating files.

Wildcard	Description	Example
*	Represents any unspecified string of characters of any length.	The string **.asc* could be used to specify all files with an extension of *.asc*.
?	Represents any unspecified single character in a character string.	Suppose you have several graphics files that are named as follows: • figure1.xwd • figure2.xwd • figure3.xwd and so on. You could use the string `figure?.xwd` to specify all of these files in a Unix command.
[<*characters*>]	Specifies a set of characters, any one of which will satisfy a pattern matching operation	Suppose you have a project named “ajax.” The project’s seismic files are named ajax.3dh and ajax.3dv. You want to list these files with their file size using the same command. You could use the Unix `ls` command with the following file specification: • ajax.3d[v.h]
~	Home directories can also be referred to by the character ~	It can be used to specify paths starting at your home directory. For example, `cd ~` would take you to your home directory.

Directory Paths and Symbols

The Unix file system is a structure that resembles an inverted tree. At the top of this structure is a root directory. Proceeding from the root directory is a branching network consisting of descending levels of directories and subdirectories. All directories are linked directly or indirectly to the root directory.

When you use a Unix command, frequently you will have to include a pathname for the directory to which the command applies. You can specify this path as a full pathname. In this case, you specify the entire pathname, beginning with the root directory (/), and proceeding through each consecutive directory level to the directory of interest. An alternative is to use a relative pathname. In this case, you specify the directory relative to the current working directory. Unix provides a limited set of symbols that represent directories.

These symbols can be used in Unix commands in place of the actual directory names. They are described in the table below.

Symbol	Description	Example
/	Full pathname of the root directory	cd / Makes the root directory the current working directory
.	(Dot.) Current directory	mv *<path><file name>* . Moves file from specified directory to the current working directory.
..	(Dot. Dot.) Parent directory (the directory immediately above the current working directory).	cd .. Makes the parent directory the current working directory.

Examining System Resources

Unix provides commands that allow you to query the computer system about current allocation of disk space. These commands are useful for determining whether certain directories are full and whether your system has sufficient swap space to run memory intensive applications such as ZAP! III!

Some of the query commands that you will find useful are described in the following table.

Unix Command	**Function**	**Syntax/Examples**
df	Lists amount of disk space occupied by currently mounted file systems. Also lists the amount of space used, the amount of space available, and how much of the system's total capacity has been used. The names that display in the list of file systems are the names of systems you can access by changing directories. Options: • -a List entries for all file systems, including those with zero total blocks. • -i List the number of used and free inodes in the inode table. (The inode table is used for cataloging files.) • -t List disk space occupied by particular types of file systems. You can specify `nfs` to obtain information about mounted file systems only, or `4.2` to obtain information about your local system only.	Syntax: df [-a] [-i] [-t <*type*>] Examples: • df -a Lists entries for all file systems. • df -t nfs Lists entries for all file systems to which your system is mounted by the network file server. • df -t 4.2 Lists entries for your local file system only.
dmesg	Gives information about system. This command looks in a system buffer for recently printed diagnostic messages and prints them on the standard output. The messages are those printed or logged by the system when errors occur. If the - flag is used, dmesg prints the new messages that have been logged since the last time that it was invoked to the screen. This message is an effective means of obtaining information about resources such as the system's installed memory and available memory.	

Unix Command	**Function**	**Syntax/Examples**
du	Lists number of kilobytes used per directory or file. If no option or <*file name*> is included, only the number of kilobytes used by the current directory is given. Options: • -s Only display the grand total for each of the specified <*file names*>. • -a Generate an entry for each file.	Syntax: du [-as] <*file name*> Examples: • du -s Displays total disk space for the current directory and its subdirectories. • du -a <*file name*> Displays disk space used by a particular file (in K). • du -a <*directory*> Displays disk space used by each file in a specified directory and its subdirectories.
kill	Terminates processes specified by process ID numbers. This command will only work for processes owned by the user (unless the user has invoked super-user status). To obtain the proper process ID number, use ps -ax. You can specify various degrees of urgency to the kill command by specifying a <*signalnumber*>. Signal numbers range from -1 to -9 in increasing urgency. A <*signalnumber*> of -9 produces the most urgent kill command. Options: • -l Display a list of signal names.	Syntax: kill [-signal] <*process ID*>

Unix Command	Function	Syntax/Examples
ps	(Process.) Displays information about the processes currently running on your terminal. Additional categories of processes can be displayed using various options. Process information is listed in the following columns: • **PID** displays the process ID number. • **TT** displays the control terminal. • **STAT** displays the state of the process. • **COMMAND** indicates the command or resource that initiated the process. Options for Sun (must all be combined to form the first argument): • -a Include processes that do not have your user ID. • -g List all processes, including those otherwise classified as uninteresting. • -l Display a long listing. • -x Include processes without controlling terminal (not available on IBM®). Options for IBM: • -e Lists information about all processes except kernel processes. • -f Generates a full listing.	Syntax: ps [-a] [-l] [-x] Examples: • ps -ax On a Sun workstation, lists all of the current processes, along with process ID numbers and other related information. • ps -ef On an IBM workstation, performs the equivalent of a ps -ax command on a Sun workstation.

Creating, Navigating, and Managing Directories

Unix provides a variety of commands for determining your position in the directory system, listing the contents of directories, and creating new directories or removing existing directories. Some of these commands are described in the table below.

Unix Command	Function	Syntax/Examples
cd	(Change directory.) Changes the working directory. If cd is used without arguments, it returns you to your login directory. To specify a change of directory with an absolute pathname, start with a / (to signify the root directory) and specify the full sequence of the directories that lead from root to the destination directory. To specify a change of directory with a relative pathname, provide the directory sequence as it occurs from your current directory, or use .. to signify the directory immediately above the present directory.	Syntax: cd *<pathname><directory>* Examples: • cd Changes the working directory to your login directory. • cd / *<directory1><directory2><directory3>* Changes the working directory to *<directory3>* using an absolute path. • cd *<directory2><directory3>* Changes the working directory to *<directory3>* using a relative pathname. (This example assumes that the current directory is *<directory1>*.) • cd .. Changes the working directory to the directory immediately above the current directory.

Unix Command	Function	Syntax/Examples
ln	(Link.) Creates a link to a file or directory. A link is a directory entry similar to the initial directory entry that was created when the file or directory was created. Any number of links can be assigned to a file. The number of links does not affect other file attributes such as size, protections, data, and so on. The default is to create a hard link. This is a directory entry just like the one made when the file was created. A hard link cannot be created across the network. Before you can delete a file, you must remove all hard links to it. An alternative is to use the -s option to create a symbolic link. This is a special directory entry that points to another named file or directory. It can span file systems. Removing the file pointed to does not affect the symbolic link. Options: • -f Force files to be linked without displaying permissions, asking questions, or reporting errors. This option is only available to the superuser. • -F Force directories to be linked without displaying permissions, asking questions, or reporting errors. • -s Creates a symbolic link.	Syntax: ln [-fs] *<file name>* [*<linkname>*] ln [-fs] *<pathname>* *<directory>* Examples: • ln -s *<path1><file1>* *<path2><file2>* Links *<file1>* to *<file2>* across the directory and redirects input from *<file1>* to *<file2>*. (The link is created as *<file2>*.)

Unix Command	Function	Syntax/Examples
ls	(List.) For each file name that is a directory, lists the contents of the directory. For each file name that is a file, lists the file and any other information requested. By default, the output is sorted alphabetically. Options: • -a List all entries, including those that begin with "." • -c Use time of last edit for sorting or printing. • -d If argument is a directory, list only its name. • -l List in long format (mode, number of links, owner, size in bytes, and time of last modification). If the file is a symbolic link, the pathname of the linked-to file is printed preceded by ->. • -r Reverse sort order to get reverse alphabetic or oldest first, as appropriate. • -s Give size of each file, including any indirect blocks used to map the file, in kilobytes (ls) or 512-byte blocks (/usr/5bin/ls). • -t Sort by time modified (last first) instead of name.	Syntax: la [-acdirst] <*directory*> <*file name*> Examples: • ls -l Lists the contents of the current directory using the long form. A d in front of a file name indicates a directory. A - indicates a disk file. A b indicates a block special file. A c indicates a character special file. • ls -l -c Lists the contents of the current directory in the order of creation. • ls -a Lists the contents of the current directory, including files that are normally suppressed.

Unix Command	Function	Syntax/Examples
mkdir	(Make directory.) Creates a directory. Use this command from the directory that you want to serve as parent directory to the new directory.	Syntax: mkdir <*directory*>
pwd	(Print working directory.) Displays the pathname of the current directory.	
rmdir	(Remove directory.) Removes the named directory. Works only on empty directories.	Syntax: rmdir <*directory*>

Examining the Contents of Files

Unix provides additional commands for locating particular files within the directory system and displaying the contents of these files. These commands are useful for locating and examining the contents of particular project files, or for locating core files whose presence in a directory might be degrading system performance. Some of these commands are described below.

Unix Command	Function	Syntax/Examples
cat	(Concatenate and display.) Reads each <*file name*> in sequence and displays it. The file is displayed continuously without any page breaks. Options: • -n Number the lines in the file. • -b Number the lines but omit numbers for blank lines. • -s Substitute a single blank line for multiple adjacent blank lines. • -v Display non-printing character (with the exception of TAB, NEWLINE, and FORMFEED characters) so that they are visible.	Syntax: cat [-nbsv] <*file name*>

Unix Command	Function	Syntax/Examples
find	Finds files by name or by other characteristics. `find` descends the directory hierarchy for each pathname in the specified pathname list, seeking files that match a logical expression written using the operators listed below. Options: • -name <*file name*> True if the <*file name*> argument matches the current file name. • -print Always true. The current pathname is displayed on the screen. Note: When you use a metacharacter in a find command, include the metacharacter in single quotation marks.	Syntax: find <*pathname*> <*list*> <*expression*> Examples: • find / -name <*file name*> -print Finds file with a global search. On a large file system with a file server, this type of search can be extremely time consuming and may degrade your system response. • find /p* <*file name*> -print Finds file with local search (in this case, the `p` directories. • find / -name <*file name*> -print Finds file with search of all directories below the current directory. • find / -name *cgm -print Finds all files with .cgm extension.
`more`	Displays the contents of a text file one screen at a time. Once a screen is displayed, you use one of the following prompts to continue the display: • Pressing the Enter key causes one additional line to be displayed as the display scrolls up one line. • Pressing the space bar causes the next screen of text to be displayed. Options: • -n Number of lines in the file. • -b Number the lines but omit numbers for blank lines. • -s Substitute a single blank line for multiple adjacent blank lines. • -v Display non-printing character (with the exception of TAB, NEWLINE, and FORMFEED characters) so that they are visible.	Syntax: more [-nbsv] <*file name*>...

Copying, Moving, and Removing Files

The Unix commands for copying, moving, and removing files have many applications. The copy and move commands enable you to duplicate existing files, copy or move files from directory to directory, and copy or move files from system to system. The remove command allows you to free up disk space in your directories by removing unnecessary or obsolete files. These commands are described below.

Unix Command	Function	Syntax/Examples
cp	(Copy.) Copies files and directories within the current file system. 1. Copies contents of *<file name1>* to *<file name2>*. The mode and owner of *<file name2>* are preserved if *<file name2>* already exists. The mode of the source file is used otherwise. 2. Recursively copies *<directory1>*, along with its contents and subdirectories, to *<directory2>*. If *<directory2>* does not exist, cp creates it and duplicates the files and subdirectories of *<directory1>* within it. If *<directory2>* does exist, cp makes a copy of the *<directory1>* directory within *<directory2>* (as a subdirectory), along with its files and subdirectories. 3. Copies each *<file name>* to the indicated directory. The base name of the copy corresponds to that of the original. The destination directory must already exist for the copy to succeed. Options: • -i (Interactive.) Prompt for a confirmation whenever the copy would overwrite and existing file. A `y` confirms that the copy should proceed. Any other answer prevents cp from overwriting the file. • -r, -R (Recursive.) If any of the source files are directories, copy the directory along with its files (including any subdirectories and their files); the destination must be a directory. • -p (Preserve.) Duplicate not only the contents of the original file or directory, but also the modification time and permission modes.	Syntax: 1.cp *<file name1> <file name2>* 2. cp -r *<directory1> <directory2>* 3. cp *<file name...><directory>*

Unix Command	Function	Syntax/Examples
ftp	(File transfer protocol.) Transfers files to and from a remote network site. ftp is the user interface of the ARPANET standard File Transfer Protocol. Options: ftp provides an extensive suite of options whose usefulness depends on your particular needs. To review these options, type `man ftp` at an xterm prompt	Syntax: ftp [-dgintv] <*host name*>
mv	(Move.) Moves files and directories around in the file system. A side effect is to rename a file or directory. The three major forms of mv are shown in the synopsis below. 1. Moves (changes the name of) <*file name1*> to <*file name2*>. If <*file name2*> actually exists, its contents are overwritten. 2. If <*directory2*> does not exist, moves (changes the name of) <*directory1*> to <*directory2*>. If <*directory2*> does exist, performs operation 3. 3. Moves one or more <*file names*> or <*directories*> into the last <*directory*> in the list. Options: • -i (Interactive.) Prompt for a confirmation whenever the copy would overwrite an existing file. A y confirms that the copy should proceed. Any other answer prevents cp from overwriting the file. • -f (Force.) Override any restrictions and the -i option. The -f option also suppresses any warning messages about modes which would potentially restrict overwriting.	Syntax: 1.mv <*file name1*><*file name2*> 2. mv <*directory1*><*directory2*> 3. mv <*file name...*><*directory*>

Unix Command	Function	Syntax/Examples
rcp	(Remote copy.) Copies files between machines. Each file name or directory argument is either a remote file name of the form <*host*>:<*path*><*file name*> or a local file or directory name. If a <*file name*> is not a full pathname, it is interpreted relative to your home directory on <*host name*>. rcp does not prompt for passwords. Your current local username must exist on the remote host machine and must allow remote command execution by rsh(1C). If your local username does not exist on the remote host machine, you can use a third party's username. Options: • -p Attempt to give each copy the same modification times, access times, and modes as the original file. • -r Copy each subtree rooted at <*file name*>. In this case, the destination must be a directory.	Syntax: rcp [-p] <*file name1*> <*file name2*> rcp [-pr] <*file name*>...<*directory*> Examples: • rcp <*host*>:<*path*><*file name*> . Used from the directory to which you want to copy the file. Copies the file from remote host to current working directory using the original file name. Your local username must exist on the remote host. • rcp <*username*>@<*host*>:<*path*><*file name*> . Same as above, except that the local username does *not* exist on the remote host. Therefore, a third-party username is invoked. • rcp <*host*>:<*path*><*file name*> <*host*>:<*path*><*file name*> Used from any remote directory. Copies a file from one remote directory to another remote directory. • rcp <*file name*> <*path*><*directory*> Used from the directory where the file to be copied resides. Copies the file to a remote directory.
rm	(Remove.) Removes one or more files from a directory. Options: • -i (Interactive.) Prompt for a confirmation that each file is to be removed. A y confirms that the file should be removed. Any other answer prevents cp from removing the file. • -f (Force.) Force files to be removed without displaying permissions, asking questions, or reporting errors. • -r Recursively delete the contents of a directory, its subdirectories, and then the directory itself.	Syntax: rm [-fir] <*file name*>...

Unix Command	Function	Syntax/Examples
rsh	(Remote shell.) Connects to the specified host name and executes the specified command. In most cases, the remote shell is closed when the command has been executed. If you do not specify a command, rsh logs you in on the remote host using rlogin. Options: • -l <*username*> • Uses the remote username instead of your local username. This option enables you to execute the command using the privileges of the remote username.	Syntax: rsh <*host name*> <*command*>... Examples: • rsh <*host name*> ls <*directory*> Logs into host, lists contents of specified directory, then closes remote shell. • rsh <*host name*> cat <*path*><*file name*> Logs into host, displays contents of specified file, then closes the remote shell.
scp	(Secure CoPy) is a secure and network-aware version of the UNIX rcp remote copy command and allows files to be transferred between different computers via an encrypted end-to-end link. Options: -r Recursively copies entire directories. -p Preserves modification times, access times, and modes for the original file.	Syntax: scp <*file name*> <*host*> Examples: • scp <*file name*> <*host*> Used to copy a file from your current directory to your own home directory on a remote host. Your local username must exist on the remote host. • scp <*file name*> <username>@<*host*> Same as above, except that the local username does *not* exist on the remote host. Therefore, a third-party username is invoked. • scp <*file name*> <*username*>@<*host*>:<*path*> By invoking a third-party username and providing a path, you can copy a file to a directory other than your home directory on the remote host.
telnet	(TELNET.) Allows you to log into a remote host using the TELNET protocol. Options: telnet provides and extensive suite of options whose usefulness depends on your particular needs. To review these options, type `man telnet` at an xterm prompt.	

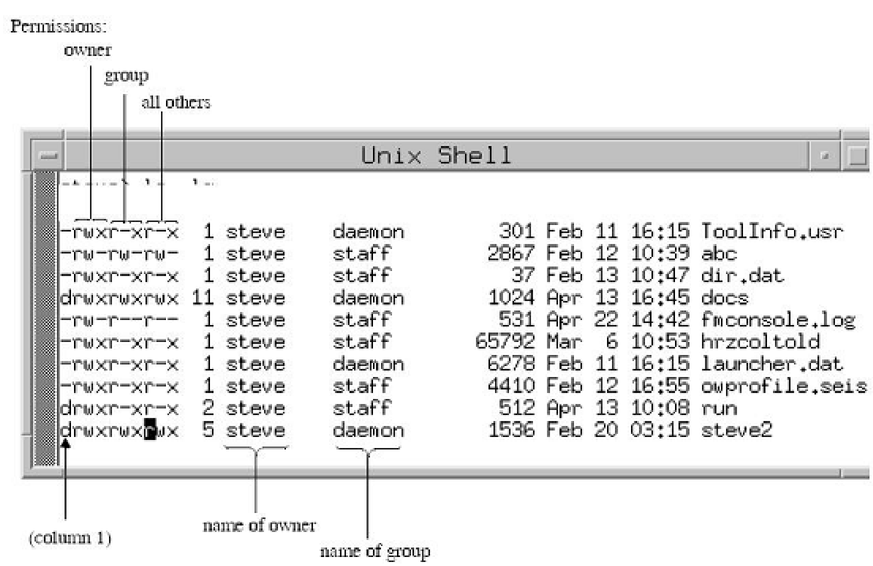
Changing the Permission Mode of a File

Permissions are assigned to both directories and files. The permission mode of a directory determines whether users can read or write to the files in the directory. The permission mode of a file determines whether users can read, write to, or execute the process specified by that particular file.

Users belong to three different categories: (1) the owner of the file, (2) the group to which the owner belongs, and (3) all others. If you are denied permission to read or write to the files in a directory, or to read, write to, or execute a particular file, chances are that you must change a permission mode. You can change the permissions assigned to a particular directory or file only if you are the owner of the directory or file, or you have superuser status.

Examining the Currently Assigned Permissions

To view the current permission mode of a file, cd to the directory within which the file resides and use the ls -lag command to display information about the files in the directory. You will receive a display that resembles the following.



Column 1 indicates whether the file is a directory, a file, or a link. A dash (-) indicates that the file is a file. A “d” indicates that the file is a directory. An “l” indicates a link to a file or directory.

Columns 2 through 4 indicate the permissions for the user. Columns 5 through 7 indicate the permissions for the group to which the user belongs. And Columns 8 through 10 indicate the permissions for all other users.

To determine what permissions are currently assigned to the different user types, use the following table.

Permission Code	Description
r	Allows prospective user to read the file.
w	Allows prospective user to write to or modify the file.
x	Allows the prospective user to execute the file. This option only applies to files that are executables.
-	Denies access of the particular type indicated by the respective column. That is, if a dash (-) displays in a read column, the read permission is denied. If it displays in a write column, the write permission is denied. If it displays in an execute column, the execute permission is denied.

Customizing Permissions for Different User Types

You can change the permissions assigned to particular user types with the following chmod command.

```
chmod <user type><operator><permission code><filename>...
```

The variables that can be used in this command are described in the table below.

Variable	Description
<user type>	Specifies which of the user types is to be affected by the permission change. Valid codes for user types: • **u** is the owner. • **g** is the group. • **o** is all others
<operator>	Specifies whether permissions are to be granted or denied. Valid options: • **+** indicates that the permissions are to be granted. • **-** indicates that the permissions are to be denied.

Variable	Description
<permission code>	Specifies the type of permission to be granted or denied. Valid codes: • **r** applies to read privileges. • **w** applies to write privileges. • **x** applies to execute privileges.
<file name>	Names the directory or file(s) to which the permissions are to be applied. If *<file name>* is the name of a directory, the chmod operation determines which users can read or write to the files in the directory. If *<file name>* is the name of a file, the chmod operation determines which users can read, write to, or execute the file.

Granting Read, Write, and Execute Permissions to All User Types

If you are the owner of a directory or file, you can grant read, write, and execute permissions to all user types by using the following command

```
chmod 777 <filename>...
```

This method uses the octal number 777 to assign permissions. The octal number method of assigning permissions is described in the online “man pages” for chmod (which you can view by typing man chmod at a system prompt). This method of assigning permissions is not described in this chapter.

To change the permissions within a particular directory and apply the changes to all subdirectories and their files, you can use the following “recursive” chmod command.

```
chmod -R 777 <filename>...
```

Archiving and Retrieving Files

You can use the tar command to archive and retrieve files. The files are archived collectively in a “tarfile.” Once a tarfile is created, additional files can be appended to its contents. Files can be retrieved from the tarfile either individually by name or collectively by directory.

The tar command is particularly useful for moving data from one Unix environment to another (for example, from the Landmark Unix environment to some other Unix environment).

The files can be archived on a disk drive, a tape drive, or a floppy drive, whichever is most appropriate. If archived to a tape drive or a floppy drive, the name provided for the tarfile is the absolute pathname of the tape drive or floppy drive.

The tar command has the following structure:

```
tar
<functiontype><functionmodifier><tarfile><block
size> <exclude-file> -I<include-file>
<filename>...
```

The variables that can be used in this command are described in the table below.

Variable	Description
tar	Creates a single archive file, called a tarfile, or appends files to an existing tarfile, or retrieves files from a tarfile. Which tar operation is performed depends on *<function type>*.
<function type>	Specifies type of tar operation to be performed. Only one function type can be specified per tar operation. Options: • -c Create a new tarfile and write the named files to it. • -r Append the named files to the tarfile. (This option does not work with quarter-inch tape drives.) • -t List the table of contents of the tarfile. • -u Add the named files to the tarfile if they are not already there or if they have been modified since they were last archived. (This option does not work with quarter-inch tape drives.) • -x Extract the named files from the tarfile. If a named file matches the name of an archived directory, this directory is retrieved with its contents. The owner, modification time, and mode are restored. If no file names are given in the tar command, all files in the tarfile are retrieved. If multiple versions of the same file exist in the tarfile, only the last one is retrieved.

Variable	Description
<function modifier>	Specifies particular variations of tar operation. Multiple modifiers can be specified. Options: • b Use the next argument as the blocking factor for tape records. The default blocking factor is 20 blocks. • B Force tar to perform multiple reads so as to read exactly enough bytes to fill a block. • e If any unexpected errors occur, exit immediately with a positive exit status. • f Use the next argument as the name of the tarfile. If f is omitted, use the device indicated by the TAPE environment variable, if set. Otherwise, use /dev/rmt8 by default. If *<tarfile>* is given as "-", tar writes to standard output or reads from standard output—whichever is appropriate. • F Exclude the files from the tarfile as follows: If one F is specified, exclude all directories name SCCS. If two Fs are specified, exclude all directories named SCCS, all files with .o as their suffix, and all files named errs, core, and a.out. • h Follow symbolic links as if they were normal files or directories. • i Ignore directory checksum errors. • l Display error messages if all links to archived files cannot be resolved. If l is not used, no error messages of this type are printed. • p Restore the named files to their original modes. • v Display the name of each file and the function being performed on it as the tar operation is performed. • w Wait for user confirmation before taking the specified action. To confirm the action to be performed, the user must type `y`. • X Use the next argument as a file containing a list of the named files or directories to be excluded from the tarfile when using the *<function type>* options c, x, or t. Multiple X arguments may be used, with one *<exclude_file>* per argument. • 0, 1, 4, 5, 7, 8 Select an alternative drive on which the tape is mounted. The numbers 2, 3, 6, and 9 do not specify valid drives. For most Landmark workstations with tape drives, a 1/4" tape drive is /dev/rst0, an 8mm tape drive is /dev/rst1, and a 9-track tape is /dev/rst. IBM workstations automatically assign numbers to the drives in accordance with the Unix remote magnetic tape (rmt) protocol. The first tape drive is numbered rmt0. For more information on the remote magnetic tape protocol, type `man rmt` at an xterm prompt.
<tarfile>	Name of tarfile to be created. If the files are to be archived to a disk file, this name is the pathname and an appropriate file name. If the files are to be archived to a tape drive, this name must be the name of the tape drive. The *<tarfile>* argument is only necessary if the function modifier f has been specified. See the discussion of the f option above.

Variable	Description
<*block size*>	Blocking factor for tape records. This argument is only necessary if the function modifier b has been specified.
<*exclude-file*>	File containing a list of named files (or directories) to be excluded from the tarfile when using the <*function type*> options c, x, or t. This argument is only necessary if the function modifier X has been specified.
-I	Function modifier that opens <*include-file*>.
<*include-file*>	A file that contains a list of files, one per line, that is read as if the file names displayed on the command line. Using this file eliminates the need to key a string of file names into the tar command. This argument is only necessary if the -I function modifier has been specified.
<*file name*>	Name of the file to be archived in, appended to, or retrieved from the tarfile. Multiple file names can be specified.

Archiving the Contents of a Directory to a Tape Drive

You can archive the contents of a directory to a tape drive using the following procedure.

1. Load the tape into the tape drive.

2. Use the cd command to change directories to the directory that you want to archive.

3. Determine the name of the tape drive to which you are archiving the data.

4. Key in the following command:

   ```
   tar -cvf /dev/rst?.
   ```

   where ? is the number of the appropriate tape drive.

   The tar operation will create a tarfile on the tape and copy the contents of the current directory to that tarfile. The name of each file will be displayed as the file is archived.

Restoring the Contents of a Tarfile from Tape to Disk

You can restore the contents of a tarfile from tape to disk using the following procedure.

1. Load the tape into the tape drive.

2. Use the cd command to change directories to the directory where you want the contents of the tarfile to be restored.

3. Key in the following command

   ```
   tar -xvf /dev/rst?.
   ```

   where ? is the number of the appropriate tape drive.

   The tar operation will restore the contents of the tarfile to the current directory. If the files in the tarfile already exist in the current directory, they will be overwritten. If they do not already exist, they will be created.

Printing Files

You can use various print commands to print the contents of files to line printers. Some of these commands are provided in the table below.

Unix Command	Function	Syntax/Examples
cancel	Cancels a printing request that has been sent to the line printer. The command line arguments may be either job IDs or printer names. When IDs are specified, cancel removes the jobs corresponding to the IDs from the printer queue. Specifying a printer cancels the request that is currently printing on the printer.	Syntax: cancel [<*IDs*>] [<*printers*>]
lp	(Line printer.) Sends a printing request to the line printer. The order in which file names display is the order in which they are printed. The print request is sent to a default printer if no alternate printer is specified. lp associates a unique ID with each request and prints it on the standard output. This ID can be used to cancel or find the status of the print job. Options: • -w Write a message on the user's terminal after <*file name*> has been printed. If user is not logged in locally, send mail instead. • -d<*dest*> Choose <*dest*> as the printer that is to do the printing. By default, <*dest*> is taken from the environment variable LPDEST, if it is set. Otherwise, <*dest*> is taken from the environment variable PRINTER. If PRINTER is not defined, the print job is sent to the default printer. • -n<*number*> Print <*number*> of copies. The default is 1. • -t<*title*> Print <*title*> on the banner page of the output.	Syntax: lp [-wd] [-d<*dest*>] [-n<*numb*>] [-t<*title*>] <*file name*>...

Unix Command	Function	Syntax/Examples
lpc	(Line printer control.) Controls operation of one or more printers. Can be used to start/stop a printer, disable/enable a printer spool, rearrange the order of jobs in a queue, or display the status of each printer with its spooling queue and printer queue. If there are no arguments, lpc runs interactively, prompting with lpc>. If arguments are used, lpc interprets the first as a command and subsequent arguments as parameters for the initial command. Options: • abort [all | [<*printer*>...]] Immediately terminate active spooling daemon on the local host and disable printing (prevent new daemons from being started by lpr(1) for the specified printers). (Super-user only) • disable [all | [<*printer*>...]] Turn off the specified printer queues, preventing new jobs from being entered into the queue by lpr(1). (Super-user only) • down [all | [<*printer*>...]] Turn off the specified printer queues, disable printer, and write message to printer status file. Normally used to take a printer down and let others know why. (Super-user only) • enable [all | [<*printer*>...]] Enable spooling on the local queue for listed printers so that lpr(1) can put new jobs in the queue. (Super-user only) • exit or quit Exits from lpc. • restart [all | [<*printer*>...]] Start a new printer daemon for print jobs left in the queue by a failure of the previous daemon. • start [all | [<*printer*>...]] Enable spooling and start a printer daemon for the listed printers. (Super-user only) • status [all | [<*printer*>...]] Display the status of daemons and queues on the local machine. This command can be run by any user. • stop [all | [<*printer*>...]] Stop a spooling daemon after the current job completes and disable printing. (Super-user only) • topq <*printer*>[*job#*...] [*user*...] Move the print jobs specified by *job#* or those jobs belonging to user to the top of the printer queue. (Super-user only) • up [all | [<*printer*>...]] Enable everything and start a new printer daemon. up undoes the effects of down.	lpc [*command* [*parameter*...]]

Unix Command	Function	Syntax/Examples
lpq	Displays the contents of a printer queue. When invoked without options, lpq reports on all the jobs in the default printer queue. For each print job in the queue, lpq reports the user's name, user's current position, names of files that comprise the job, job ID, and total size in bytes. Options: • -P<*printer*> Provide information about the queue for <*printer*>. • -l Provide information in the long format, including the name of the host from which the print request originated. • + <*interval*> Display queue information periodically until the queue is empty. The variable <*interval*> is specified as no. of seconds.	Example: • lpq -P hp4 Provides queue entries for printer hp4.
lpr	Creates a spooled printer job for subsequent printing as available. Each print job consists of a control file and one or more data files. Options • -P<*printer*> Send output to <*printer*>. • -#<*number*> Produce <*number*> of copies. • -T<*title*> Use <*title*> instead of file name as the title of the printout.	Syntax: lpr [-P<*printer*> [-#<*number*>] [-T<*title*>] <*file name*>...
lprm	Removes a job or jobs from a printer's spooling queue. Since the spool directory is protected from users, using lprm is normally the only method by which a user can remove a job. When used without arguments, lprm deletes the job that is currently active, provided that the user who invokes lprm is the same user that requested the print job. You can remove a specific job by supplying its job number as an argument. To obtain the job number, use lpq to query the queue. Options: • -P<*printer*> Specify a particular printer to which the lprm job applies. Otherwise, the job is applied to the default printer. • - Remove all jobs requested by you. • <*IDnumber*> Remove the job with ID number specified by <*IDnumber*>.	Syntax: lprm [-P<*printer*>] [-] [<*IDnumber*>...]

Unix Command	Function	Syntax/Examples
lpstat	(Line printer status.) Displays information about the line printer spooling system. If no options are given, lpstat prints the status of all requests made to the line printer by the user. Options: • -d Print the system default destination for output requests. • -r Print the status of the printer request scheduler.	lprm [-P<*printer*>] [-] [<*IDnumber*>...]

Using a Text Editor to Create and Edit Files

gedit is a text editor that is bundled as a user tool on all Landmark workstations as a component of the Unix operating system. You can use gedit to create new ASCII text files and to edit existing ASCII files. For example, you can use *vi* to create well data files. You can then import these files to the Seis/3D project using the appropriate import option. You can use *vi* to edit ASCII files that you have exported for this purpose. You can also use it to edit system administration files if necessary (for example, to edit your *.Xdefault*s file or one of your *.profile* files).

To execute it, open a xterm window and type: `gedit`

Appendix **B**

Miniworkshop Answers

This appendix contains the complete steps for the mini-workshop exercises. You should refer to this information only if you are unable to complete the exercises on your own.

Miniworkshop: ASCII Well Loading

This mini-workshop shows how to add a new well, core data, and production data to an existing project. Follow instructions closely.

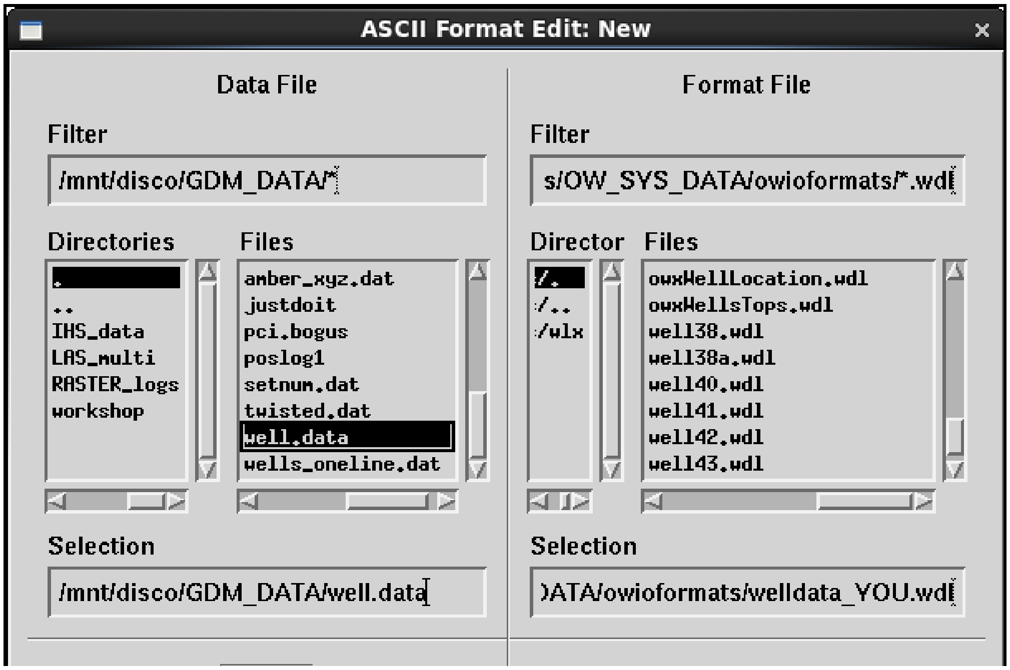
Changing Projects

1. Use **Project Status** to change from DATAIO_TRAINING to **MINI_WORKSHOP, <ALL DATA>**. Select **US Oil Field** for the session measurement system.

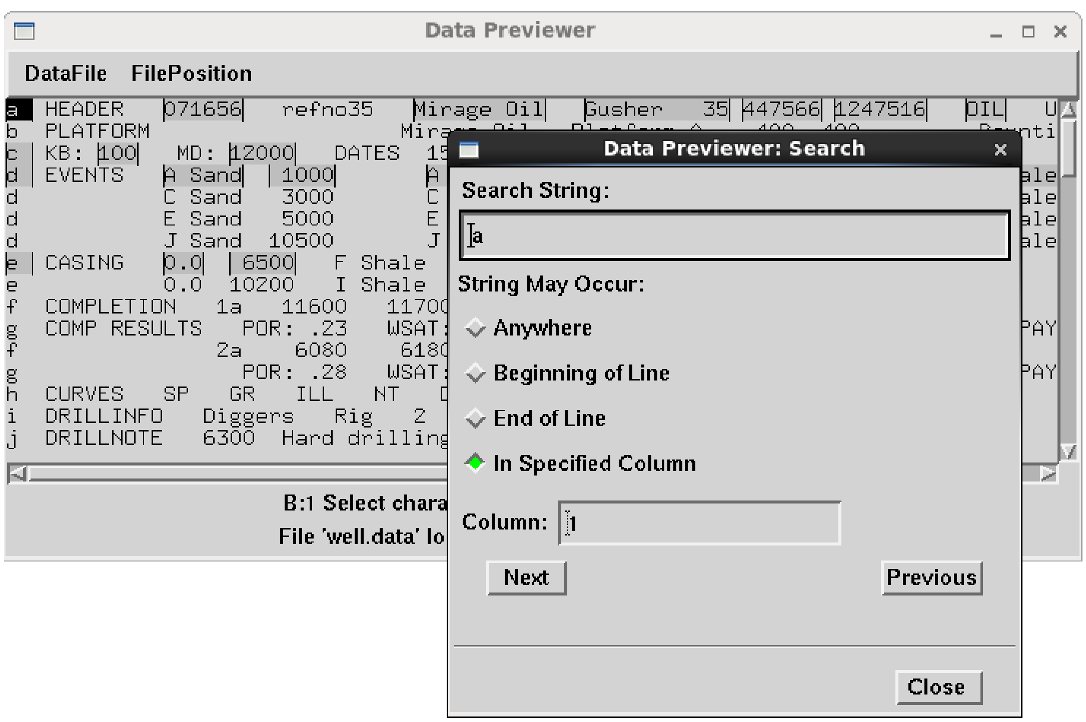
2. Select **Project > Interpretation ID Manager** to define an interpreter for this project.

Loading a New Well into the Project Using the ASCII Loader

3. Use the ASCII Loader to load the well.data file. Name your new format file `welldata_<your initials>.wdl`.

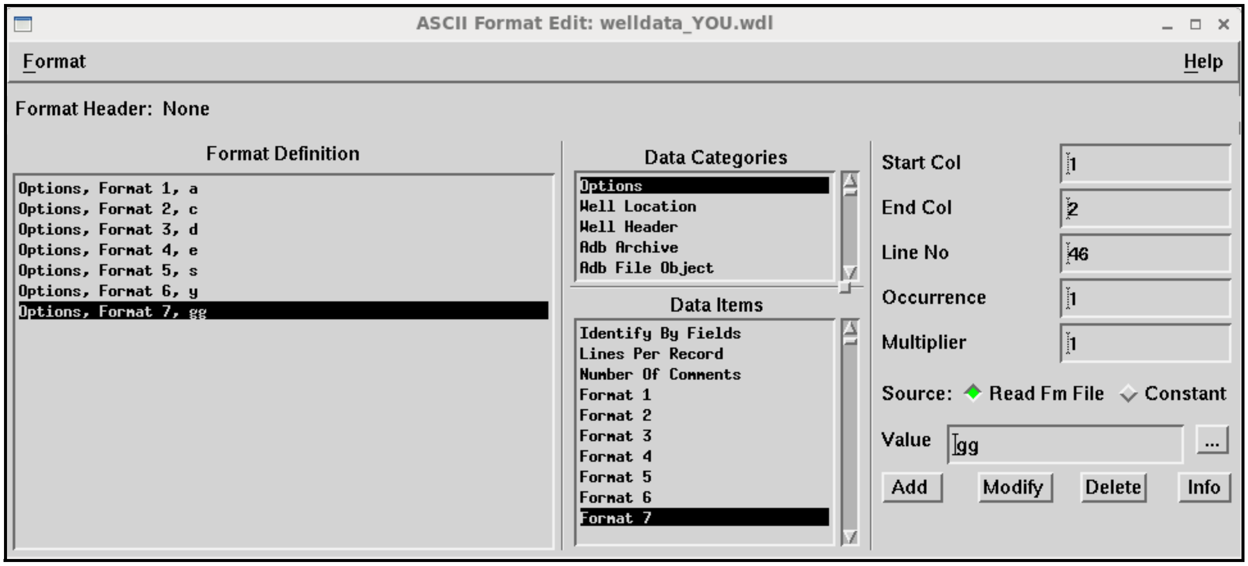


4. In the Data Previewer window, select **FilePosition > Search** to find occurrences of the a string in column 1.



In this file, the start of a new well is indicated by “**a _**” (or a followed by a space, not aa) in columns 1 and 2.

5. Load the following format flags (all definitions occur in columns 1 and 2; the underscore “_” represents a space):

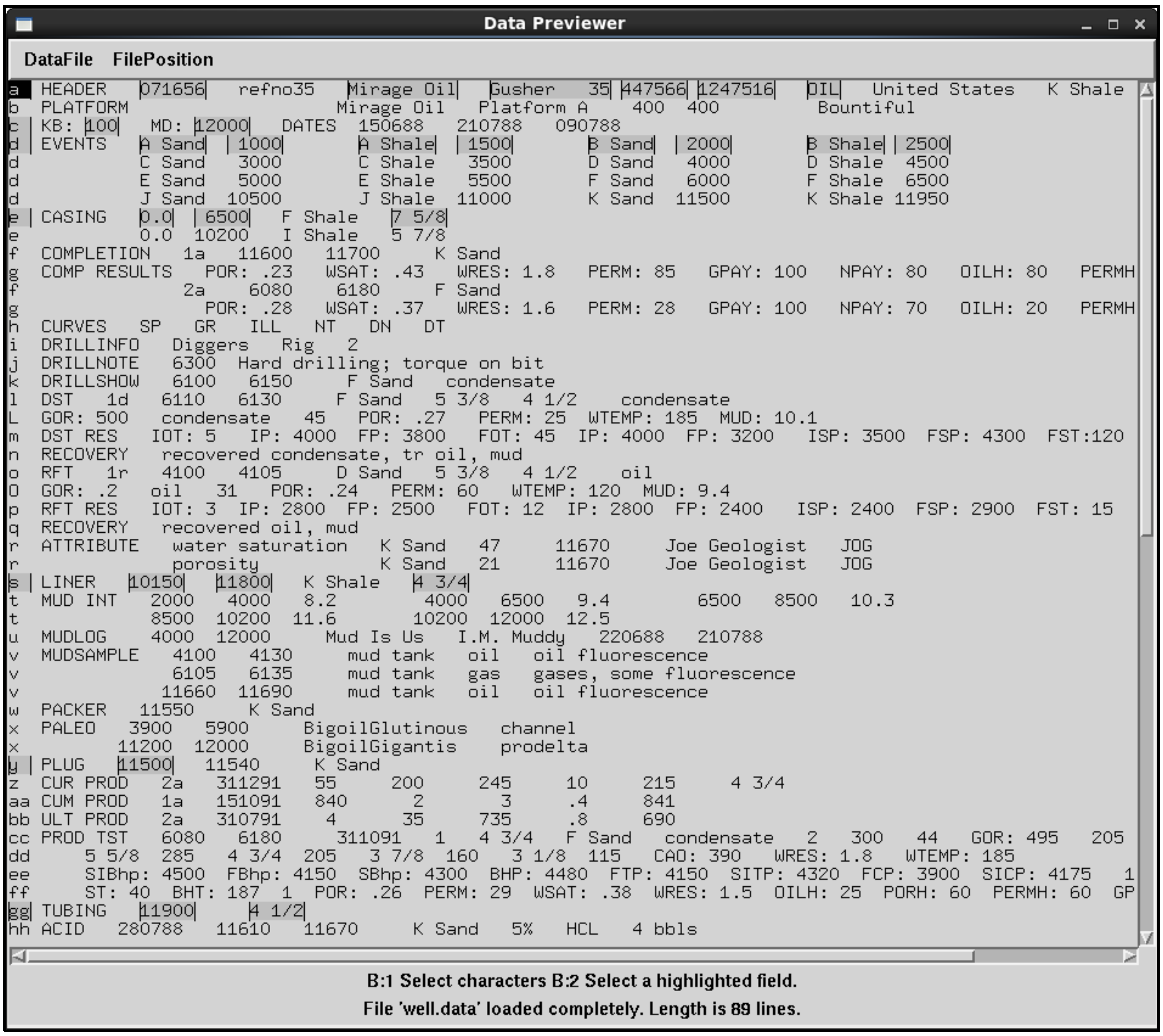


Format 1	a_	Format 5	s_
Format 2	c_	Format 6	y_
Format 3	d_	Format 7	gg
Format 4	e_		

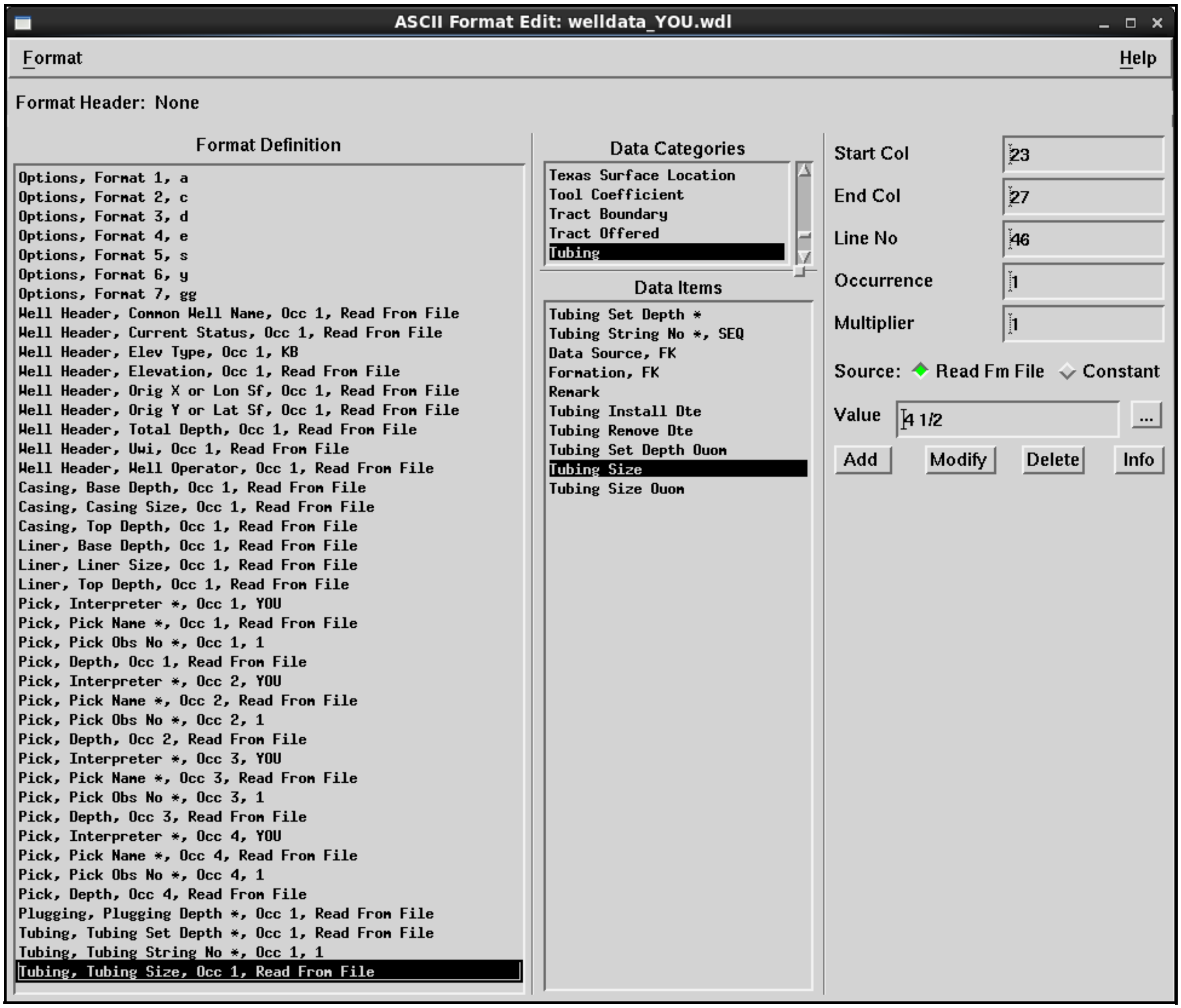
Format Flag	**Data Category**	**Data Item**	**Start Columns**	**End Columns**	**Occurrence**
a_	Well Header	Uwi, R	13	18	1
a_		Common Well Name	45	55	1
a_		Current Status	74	76	1
c_		Elev Type	4	5	1
c_		Elevation	8	10	1
c_		Total Depth	18	22	1
a_		Well Operator	32	41	1
a_		Orig X or Lon Sf	57	62	1
a_		Orig Y or Lat Sf	64	70	1
d_	Pick	Pick Name *, FK	13	18	1
d_			33	39	2
d_			54	59	3
d_			74	80	4
d_		Depth	21	25	1
			42	46	2
			62	66	3
			82	86	4
d_		Interpreter *, FK	Constant Value = *your initials*		1, 2, 3, 4
e_	Casing	Top Depth, R	13	15	1
e_		Base Depth, R	18	22	1
e_		Casing Size	36	40	1
s_	Liner	Top Depth	12	16	1
s_		Base Depth	20	24	1
s_		Liner Size	38	42	1
y_	Plugging	Plugging Depth	11	15	1

Format Flag	Data Category	Data Item	Start Columns	End Columns	Occurrence
gg	Tubing	Tubing Set Depth *	13	17	1
gg		Tubing String No *, SEQ	Constant Value = 1		1
gg		Tubing Size	23	27	1

When done, your Data Previewer window should look much like this:

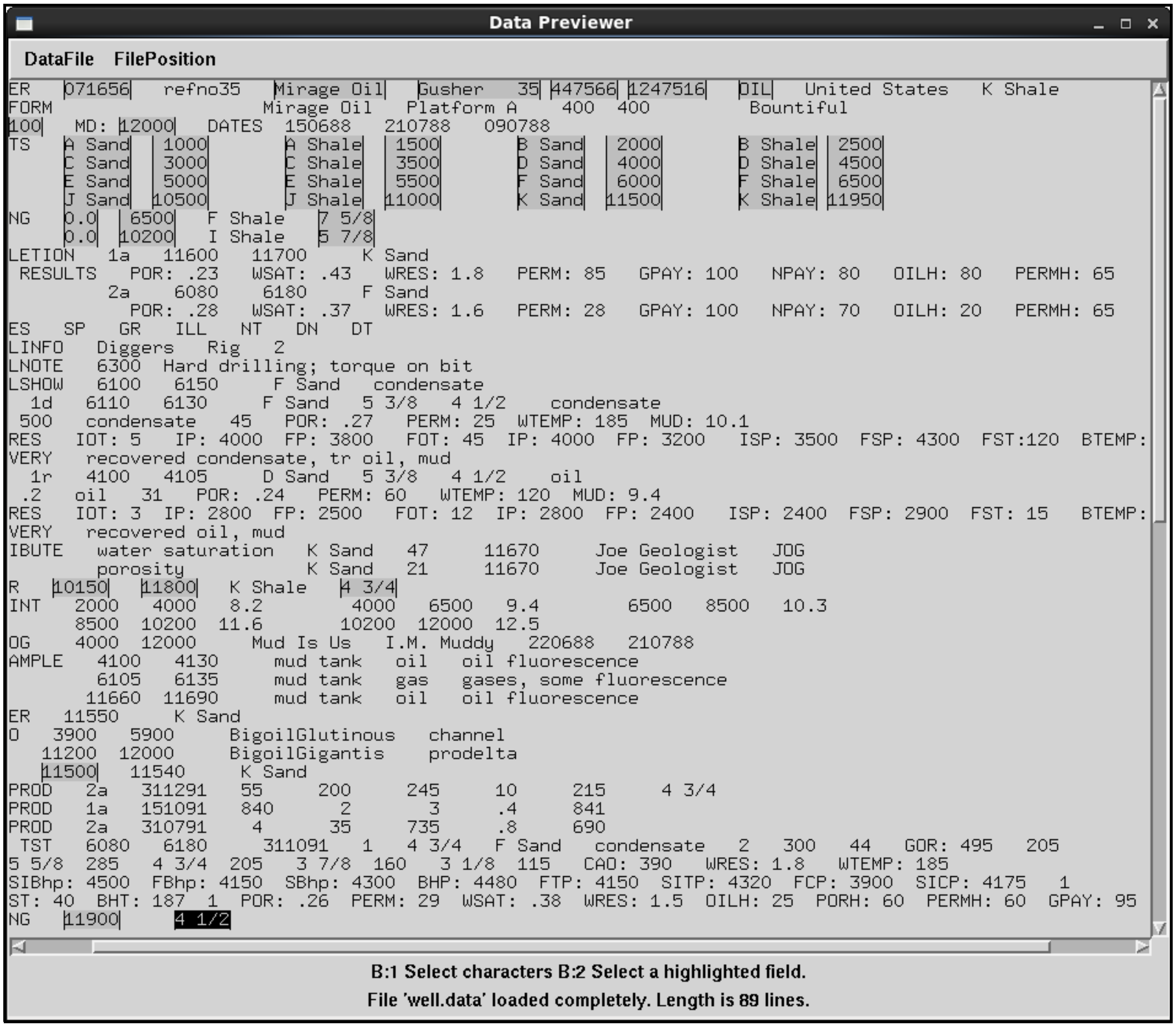


The Format Definition section of your ASCII Format Edit window should look much like this:



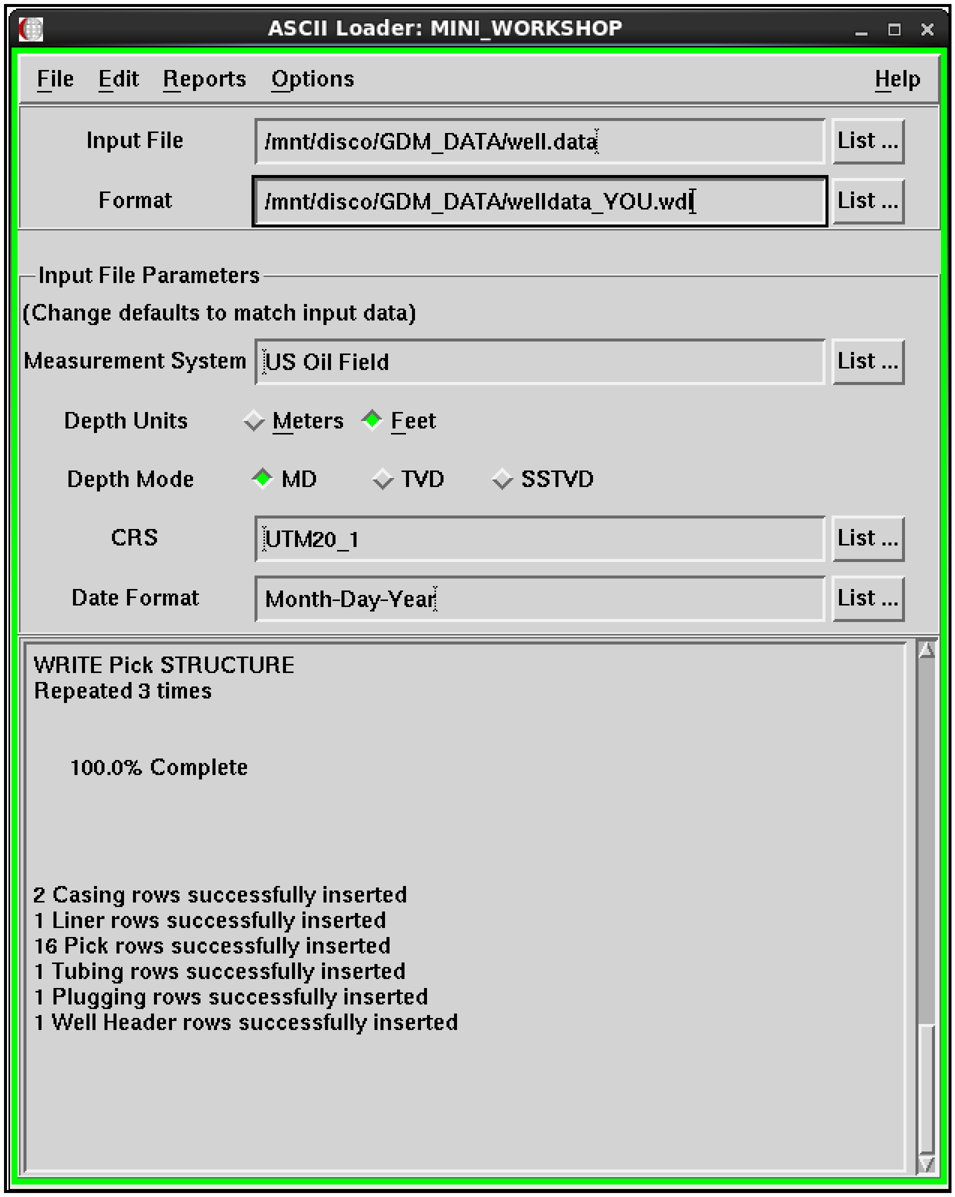
6. Select **Format > Save (needed)** in the ASCII Format Edit window to save your completed format definition. Click **Yes** to confirm.

7. Select **Format > Test** in the ASCII Format Edit window to make sure the data will load correctly. Select **Start** from the Test menu to begin the test. After the test, click **Stop** and then **Close**.



8. In the ASCII Loader window, make sure the correct file and format inputs are selected. Set the depth units to **Feet**, the depth mode to **MD**, and accept the default **UTM20_1 CRS**.

9. Select **File > Load** from the ASCII Loader window. When prompted, click **OK** to load the data.



10. Verify the load in Well Data Manager.

    - Open the Well Data Manager and select <**All Well Header**> when prompted for the Filter Project Data.

    - Search for your new well:
      UWI = 071656, Common Name = Gusher 35

    - Examine the following data forms to ensure that your data loaded properly:

      — Casing

      — Liner

      — Pick

      — Plugging

      — Tubing

      — Well Header

11. Verify the load data in the Web OpenWorks (WOW) software.

    - Type `http://<your machine name here>/` into your browser window.

    - Click **OpenWorks** in the left pane of the WOW main window.

    - Click **MINI_WORKSHOP** in the middle pane.

    - Click **36** next to Wells in the Main Data table. The MINI_WORKSHOP Wells list displays, showing that Gusher 35 was added to the list.

    - In the MINI_WORKSHOP Wells list, click **Create list**. The Create well list in MINI_WORKSHOP dialog box opens.

    - Type `All Wells` into the List Name field and click **Submit**. Click **Close** when List created displays in the dialog box.

12. Exit Well Data Manager and Well List Manager.

Appendix C
Loading IHS Data

Introduction

The new OpenWorks Data Import tool greatly facilitates the loading of well and production data supplied by the IHS Energy Group into the OpenWorks database. The simplified workflow consists of selecting the data and format files and setting input parameters.

Format files have been updated for fixed-column and comma-delimited IHS data files. When these IHS format files are selected by the user, the Data Import tool automatically applies the string substitution file *IHSsubstr.man.xml* for converting IHS measurement, unit, and date codes to OpenWorks standards.

Loading IHS Data

The workflow for loading data files from IHS Energy Group to OpenWorks projects is greatly simplified with the Data Import tool. Input data can be in either the 297 Well format or the 298 Production format.

The format files for loading IHS data have been updated for use with the new Data Import tool. The IHS format files are located in the <path>/OW_SYS_DATA/owioformats directory. The location of this directory is defined in *$OWHOME/conf/owdir.dat*.

IHS297.All.afm.xml (or IHS297.AllComma.afm.xml) – Loads all principal data types from an IHS 297 well data file in fixed column (or comma-delimited) format. Data categories include:

- Carter and Congressional Style Locations
- Casing
- Completion
- Core
- Directional Survey
- DST/RFT Data
- Field Prospect
- Liner
- Mud Report
- Narrative Surface Location
- Northeast Surface Locations
- OCS Surface Location
- Surface Picks
- Texas Surface Location
- Total Depth data
- Tubing
- Well Date
- Well Perforation
- Well Test
- Well Treatment

(See general descriptions below.)

IHS298.All.afm.xml (or **IHS298.AllComma.afm.xml**) – Loads all principal data types from an IHS 298 production data file, in fixed column (or comma-delimited) format. Data categories include:

- Carter Surface Locations
- Well Producing Zone
- Well Prod Cumulatives
- Well Prod Monthly Production
- Well Test.

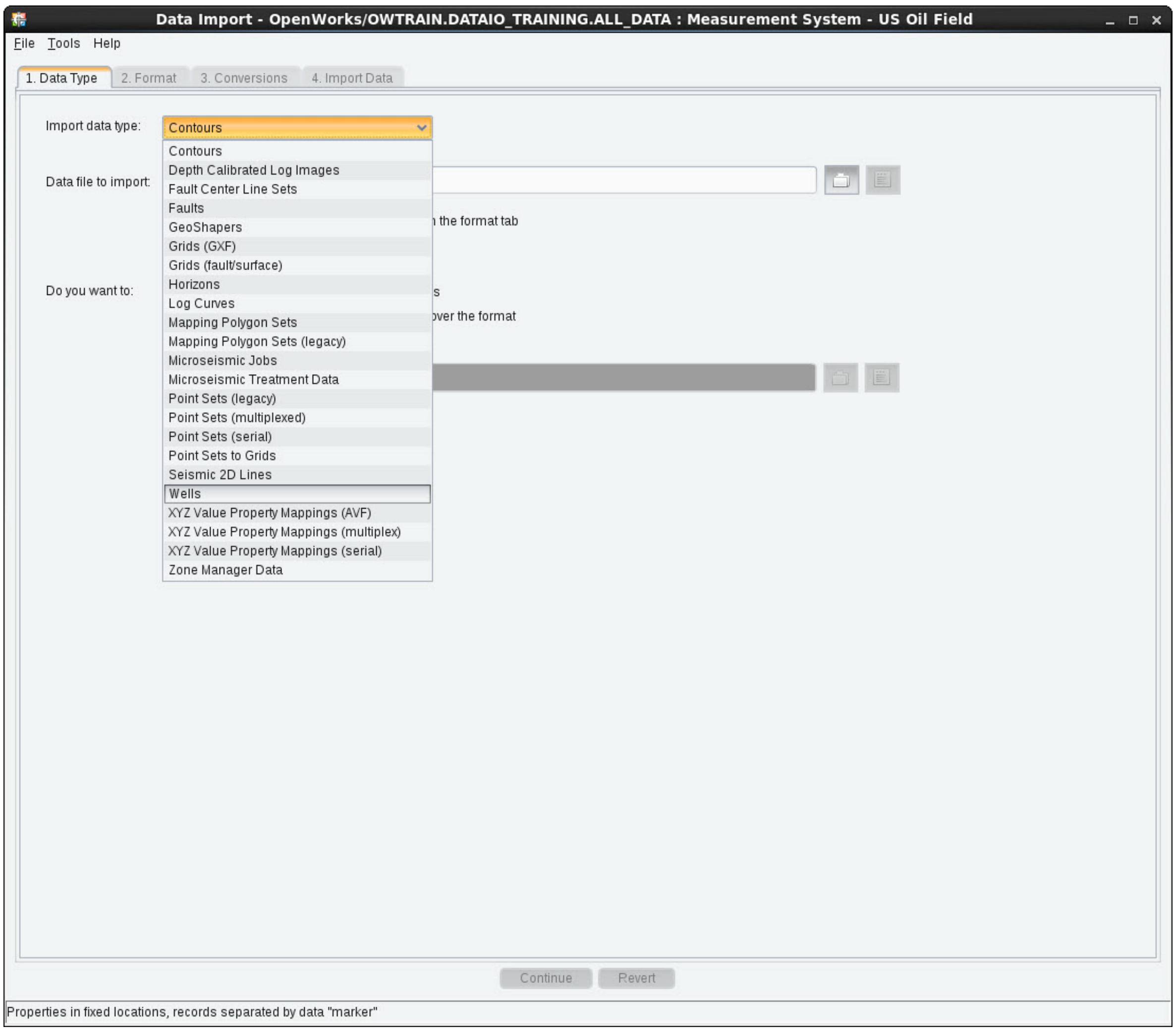
IHSsubstr.man.xml – String substitution file for converting IHS measurement, unit and date codes to OpenWorks standards. This file is required for loading any IHS data files. It is toggled on by default in the Well Options tab when an IHS297 or IHS298 format file has been selected, as indicated by checkbox for the parameter “IHS 297 or IHS 298”.

Exercise C-1. Loading IHS 297 Well Data

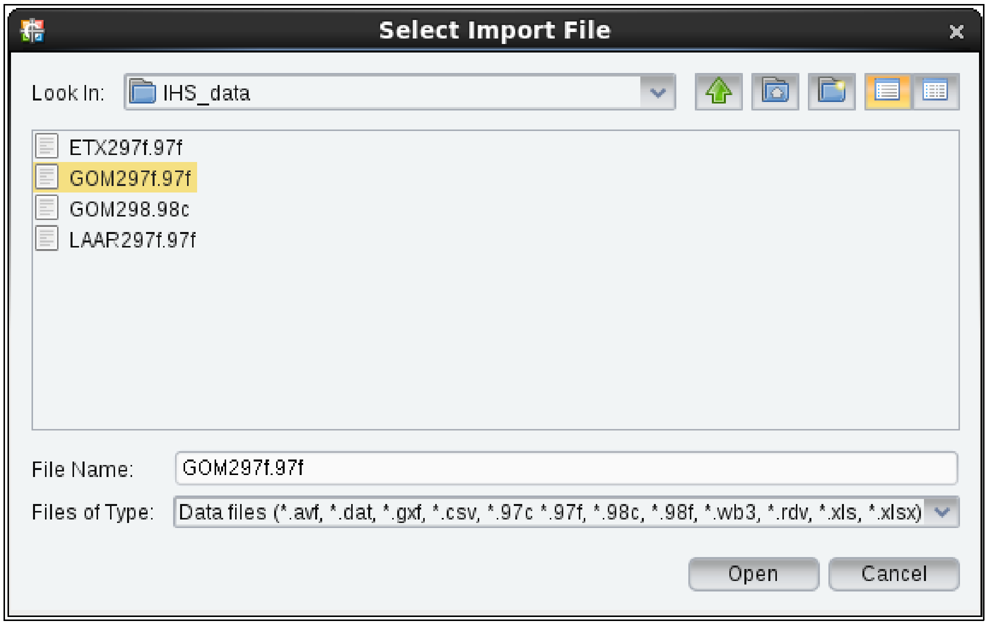
1. Set the OpenWorks project to **DATAIO_TRAINING**.

2. On the OpenWorks command menu, select **Data > Import > Data Import** to open the Data Import tool.

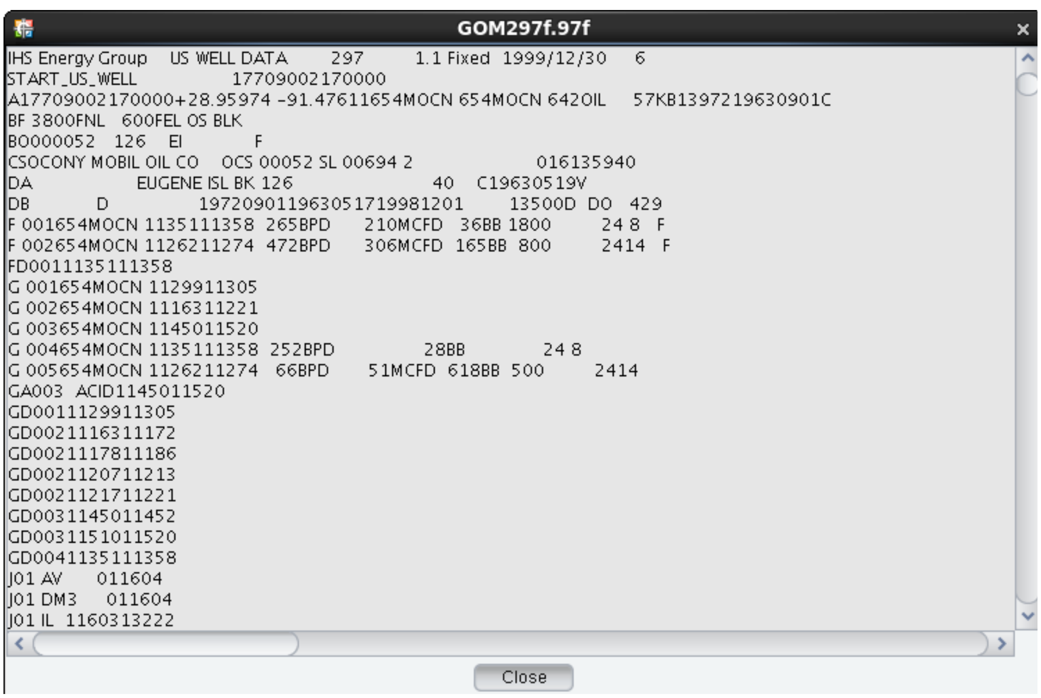
3. The Data Type tab window will be active by default. Select **Wells** from the Import Data Type drop-down menu.



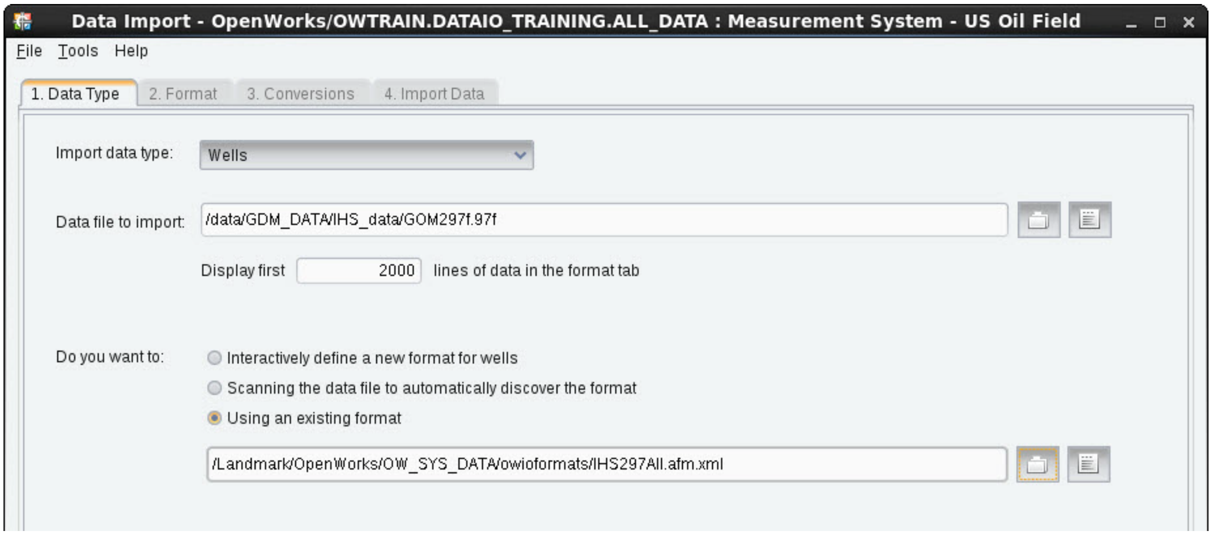
4. Click the **Select Input File** icon to select the data file to be imported. Browse to the folder named **IHS_data**, located under **GDM_DATA**, and select the file named **GOM297f.97f**. Click **Open**.



5. After selecting the file, you can click the **View Selected Data File** icon to view the contents of the file. The selected file named **GOM297f.97f** was created with the IHS well export format. Notice this data file has fixed width fields of data.

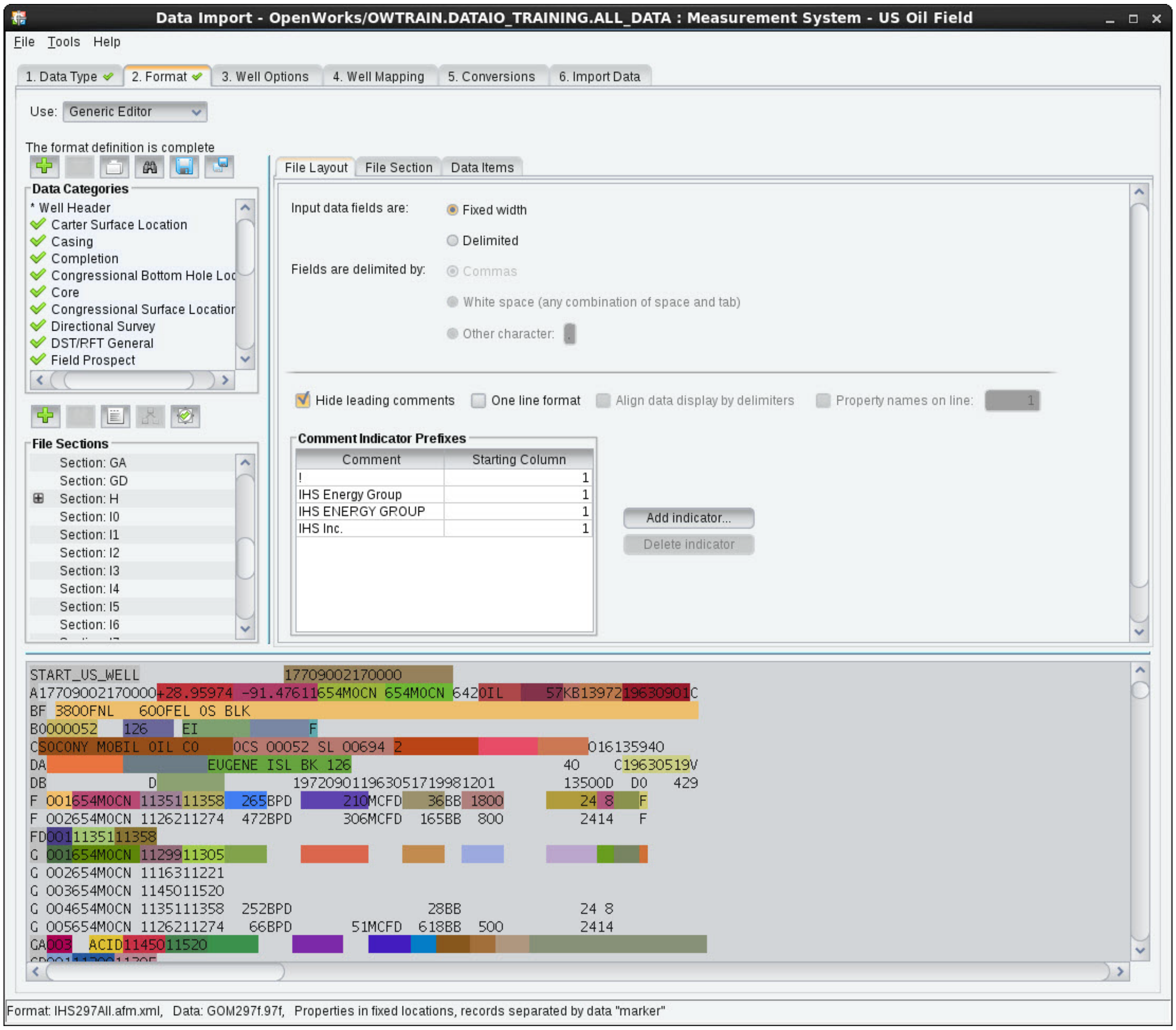


6. There are three options for defining the format of an input file. Toggle on **Using an existing format**, and select the format file **IHS297All.afm.xml** (for fixed column data files).



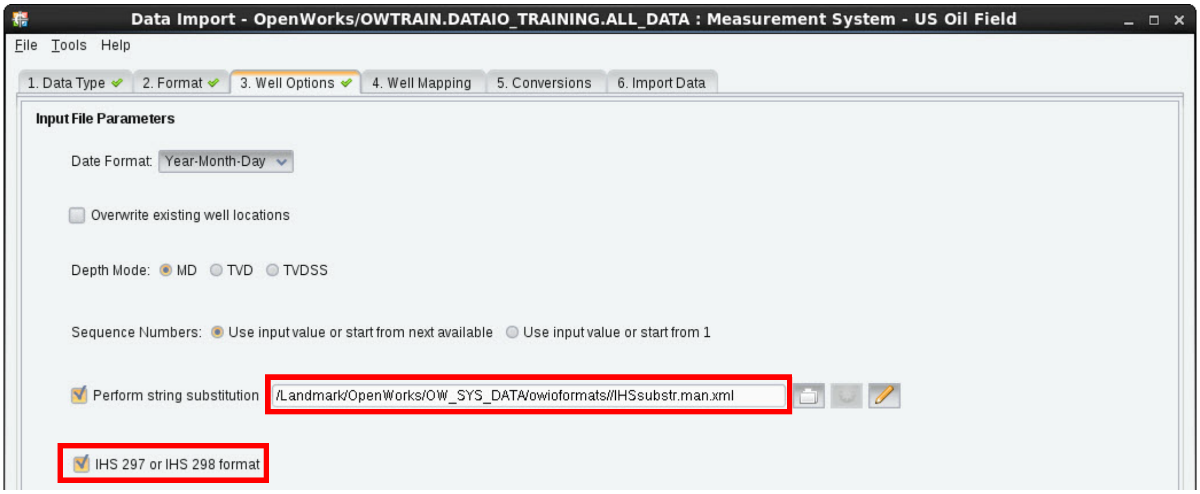
7. Click **Continue** at the bottom of the Data Type window to finalize your file selections and to proceed to the next tab to examine the format file.

8. In the **Format** tab, notice that data items defined by the format file are indicated by color highlighting of the input data file in the lower pane.



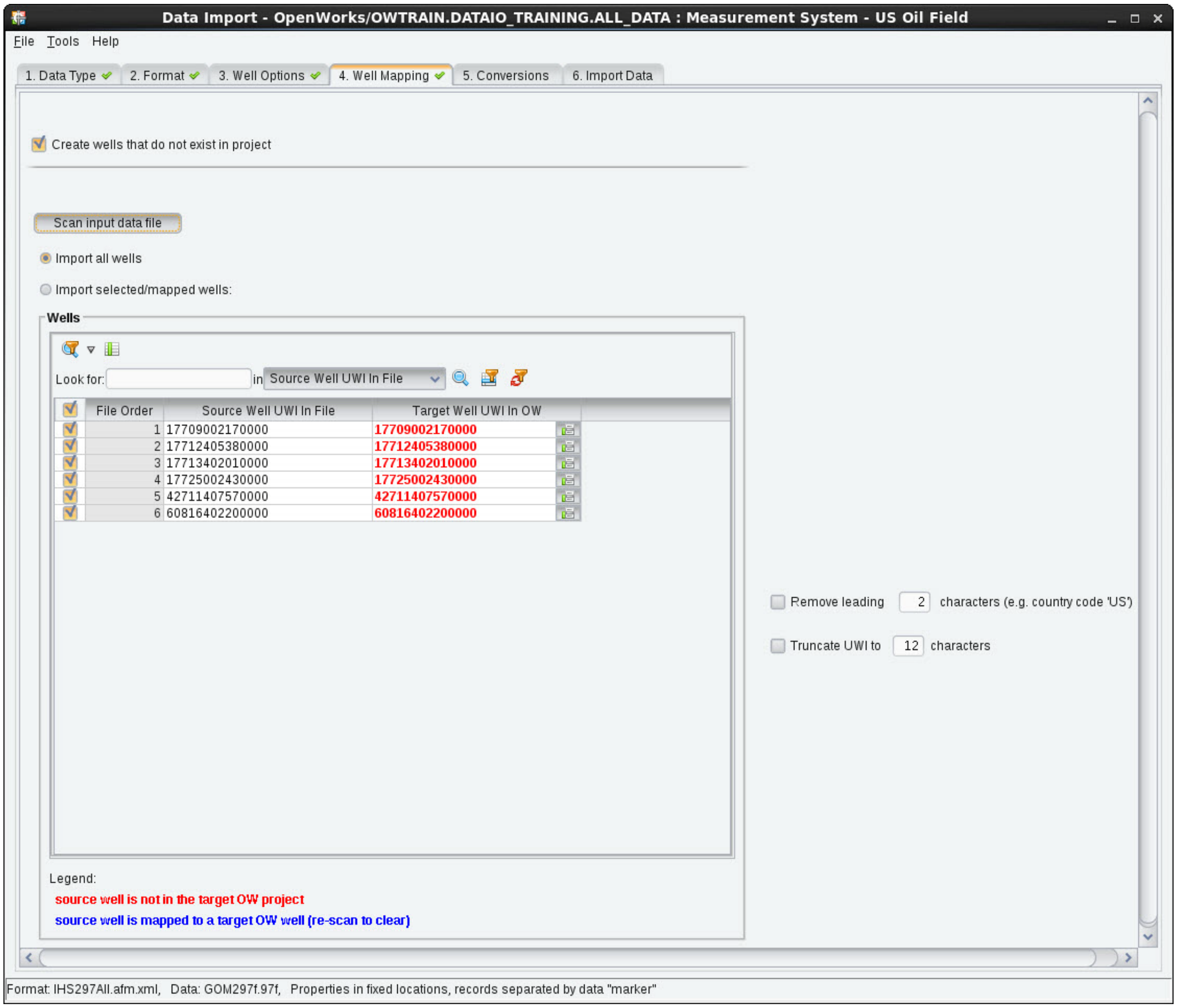
9. Accept the format definitions and proceed to the Well Options tab window.

   In the Well Options window, the default date format is Year-Month-Day. The Data Import tool automatically activates the **IHS 297 or IHS 298 format** option and the **Perform string substitution** option; IHSsubstr.man.xml is selected by default.



10. Proceed to the Well Mapping tab, where the **Create wells that do not exist in Project** option is toggled on by default. Click the **Scan**

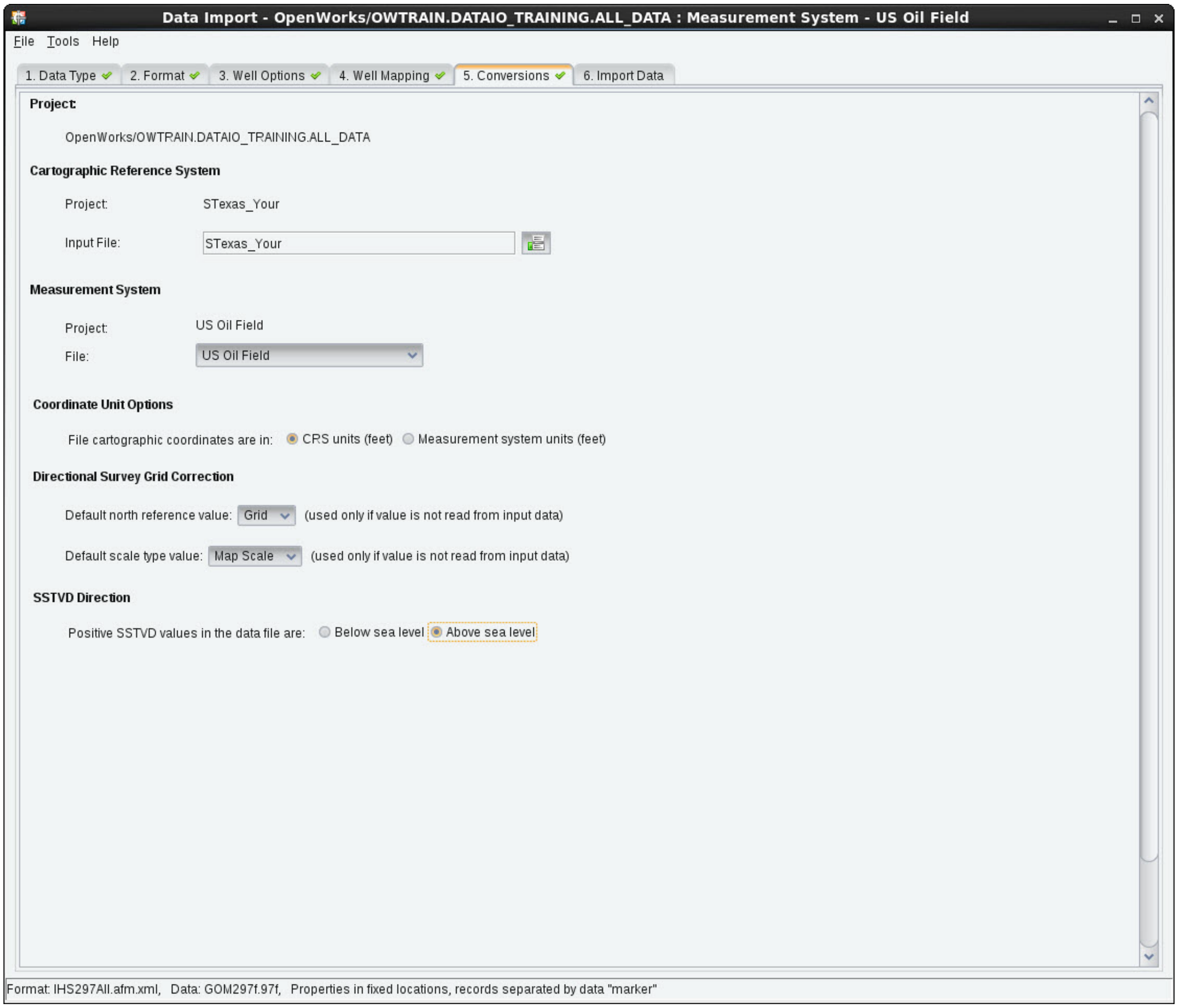
button Scan input data file to display wells available for loading from the input data file.

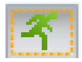


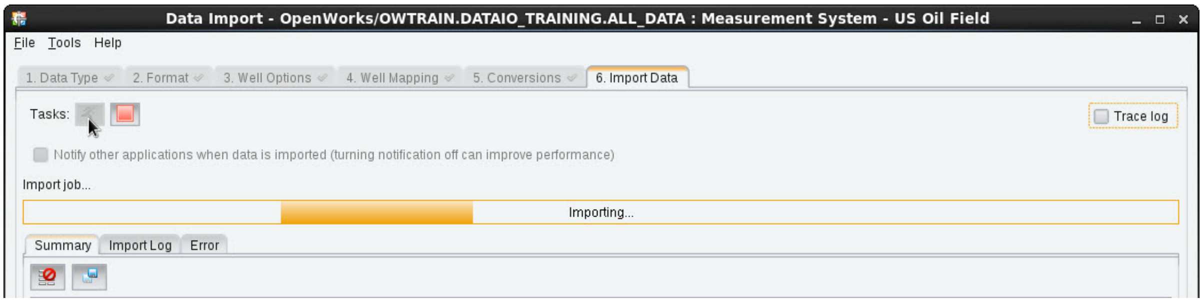
Notice that the wells listed under the column heading Target Well UWI in OW are shown in red font. This indicates these wells currently do not exist in the database and will be created upon import. Wells that exist in the database would display in blue font.

11. By default, the **Import all wells** option is toggled on, and all check boxes in the well list are marked. To import only selected wells, toggle the **Import selected wells** option on, then check the boxes for the wells you want to load. For this exercise, toggle on the **first four wells**.

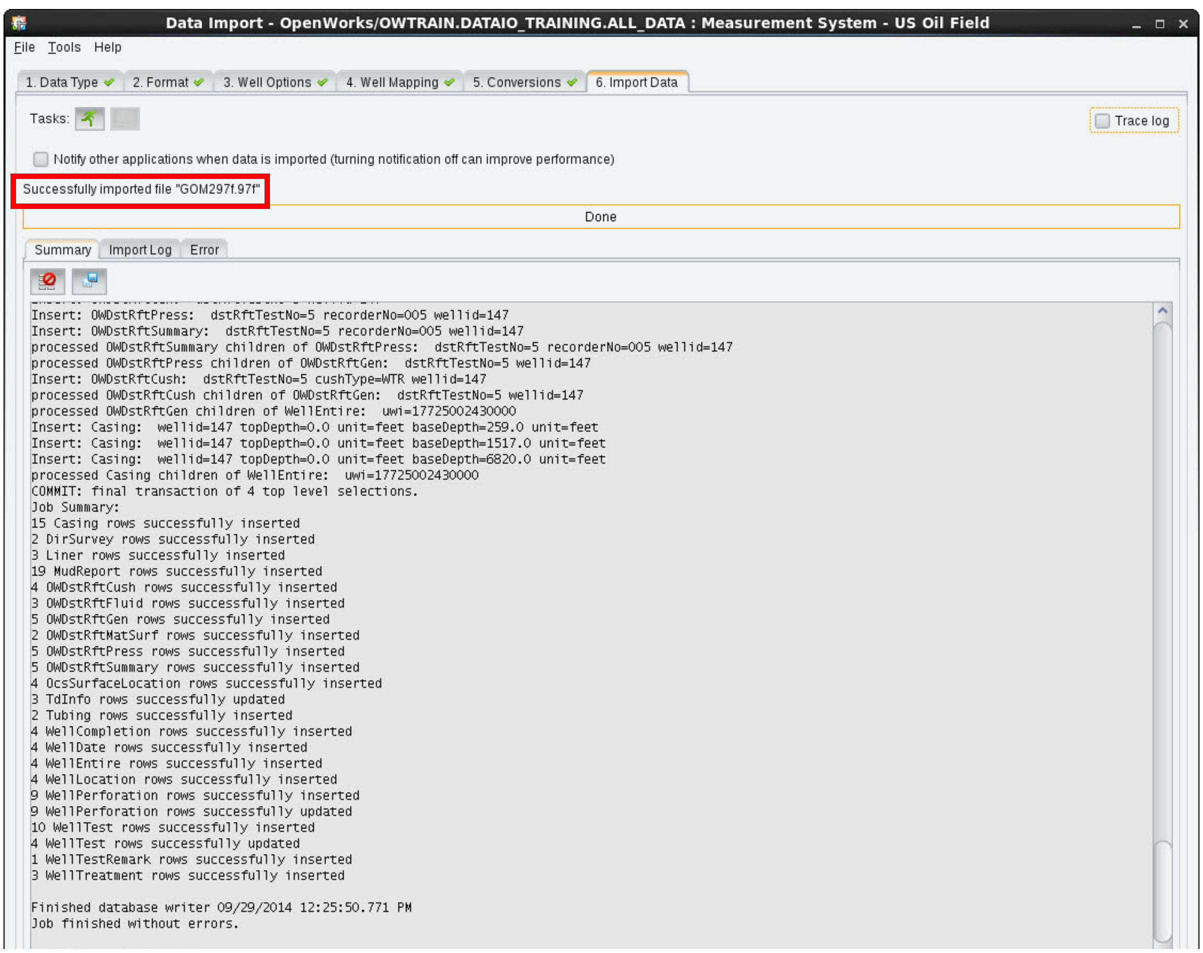
12. In the Conversions tab window, check your selection for the data CRS and set Positive SSTVD values to **Above sea level**. Accept the settings in the picture below:



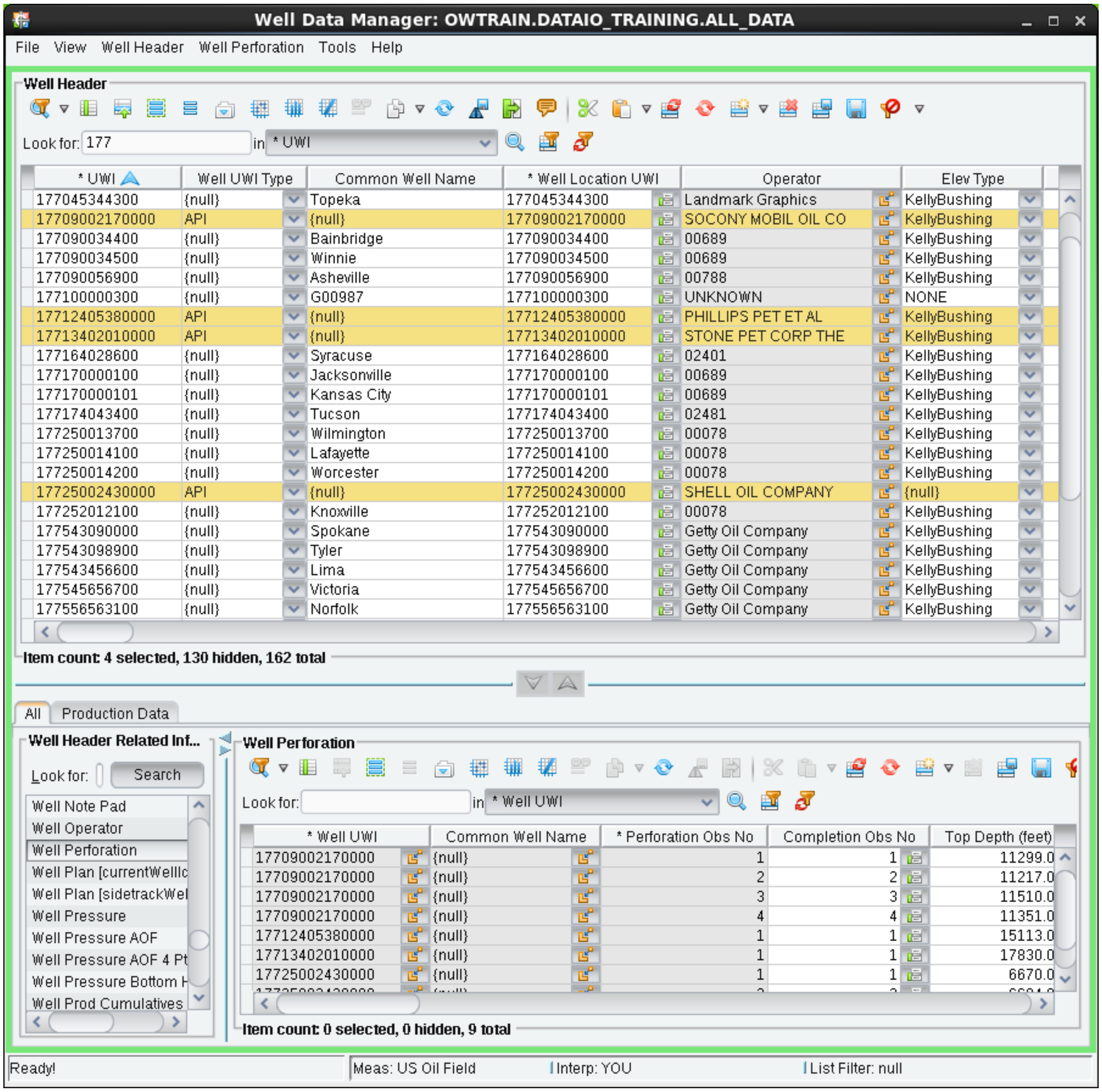
13. In the Import Data tab window, click the **Run Import Job** icon  to load the data file. A progress bar appears and the status line "Job running…" is displayed.



The Data Import tool continues to write to the Import Log for a time after the import has completed. Watch for the status line to display "Successfully imported file," then check loading reports in the Summary and Import Log tab. The Error tab will display error messages in the event the import is unsuccessful. You can Save the Summary report into a text file for later reference.



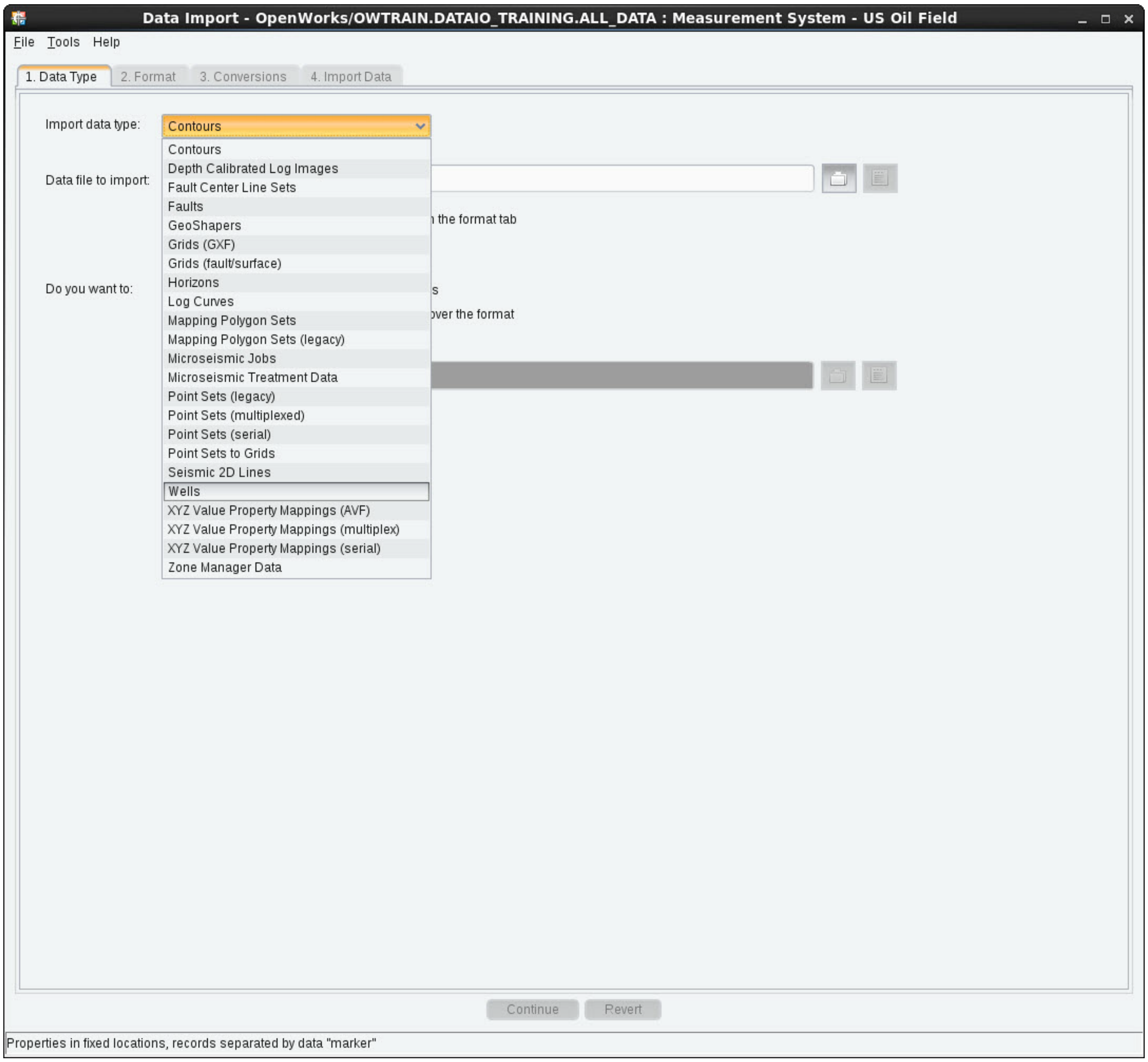
14. Verify the imported wells in the Well Data Manager.



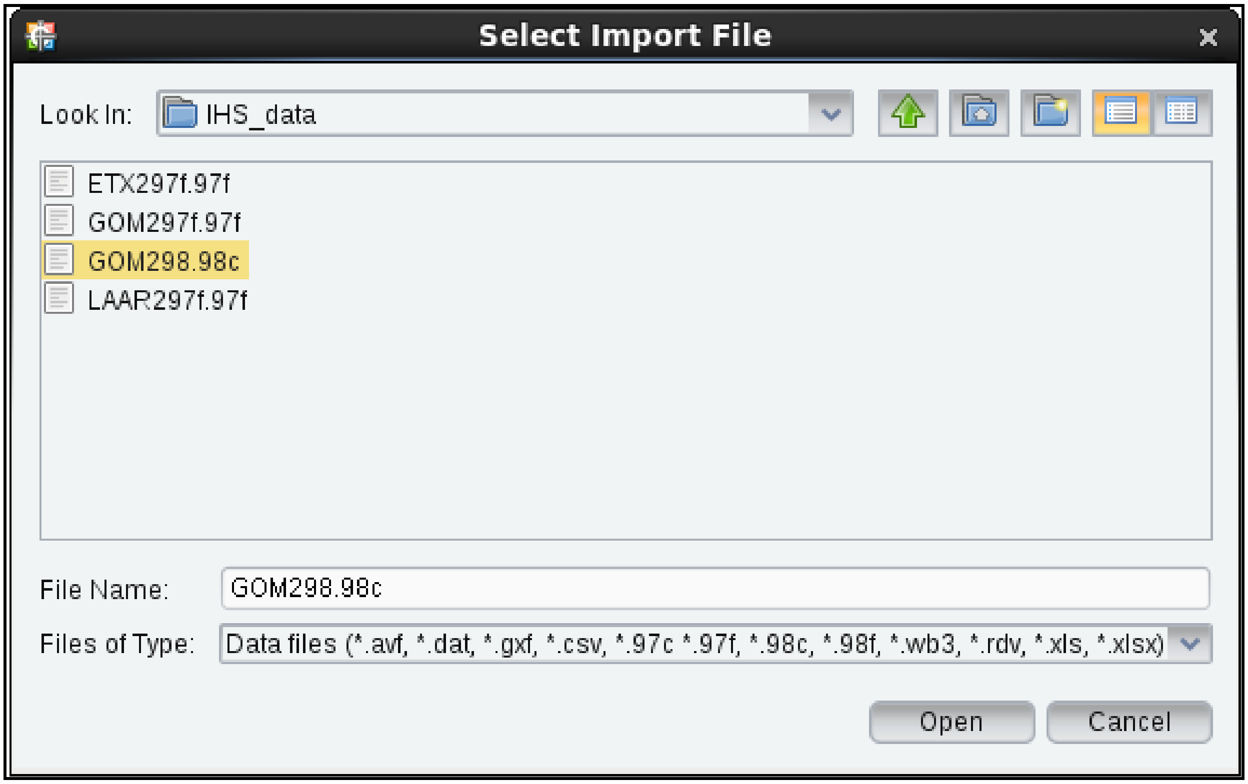
Exercise C-2. Loading IHS 298 Production Data

1. Open the Data Import tool from the OpenWorks command menu by selecting **Data > Import > Data Import**.

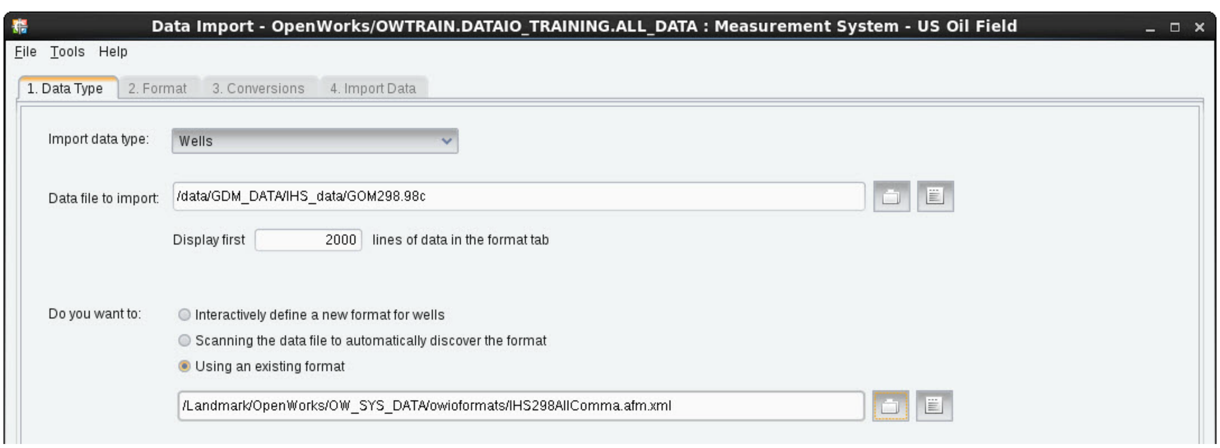
2. The **Data type** tab window will be active by default. Select **Wells** from the Import data type drop-down menu.



3. Click the **Select Input File** icon  to select the data file to be imported. Browse to the folder **IHS_data** located under GDM_DATA, and select the file **GOM298.98c**. Click **Open**.

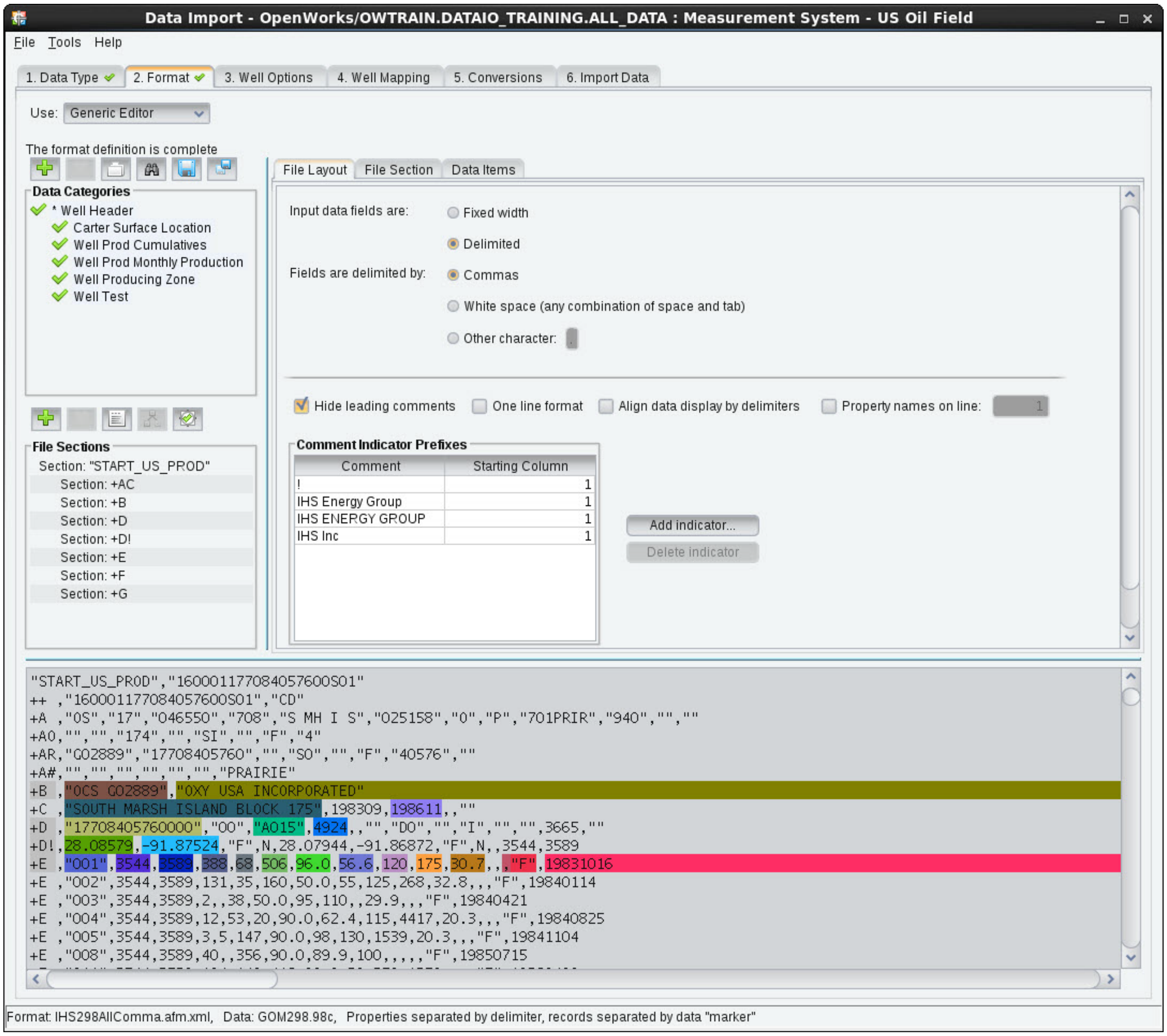


4. The filename indicates that this is a comma-delimited file. Toggle on the **Using an existing format** option, then select the format file **IHS298.AllComma.afm.xml** (for comma-delimited data files).



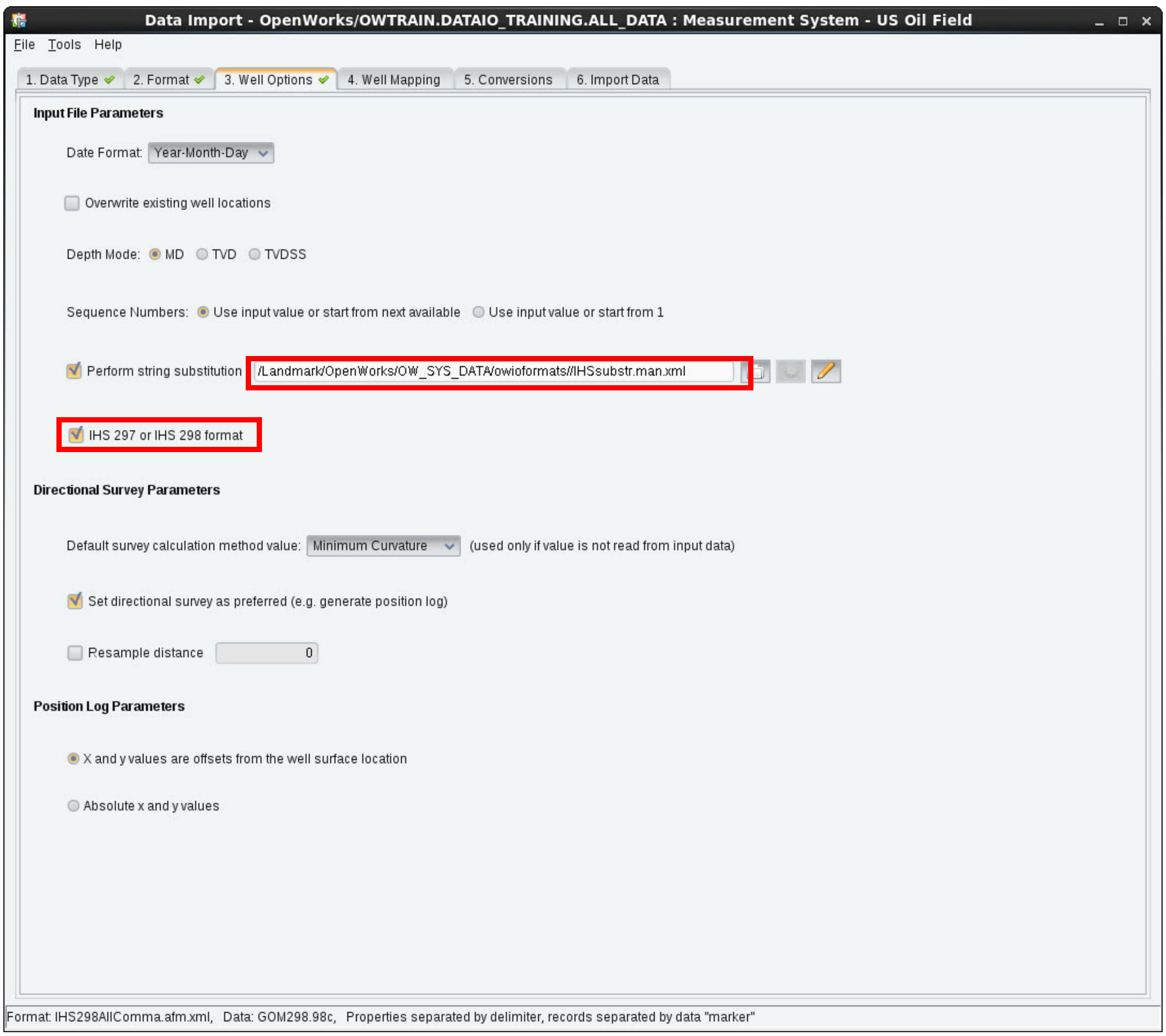
5. Click **Continue** to finalize your file selections and to proceed to the Format tab window.

   Notice that data items defined by the format file are highlighted in between the commas in the data file.



6. Keep the format definitions and proceed to the Well Options tab window.

   The default Date Format is Year-Month-Day. The Data Import tool will automatically activate the **IHS 297 or IHS 298 format** option and the **Perform string substitution** option **IHSsubstr.man.xml** will be selected by default.

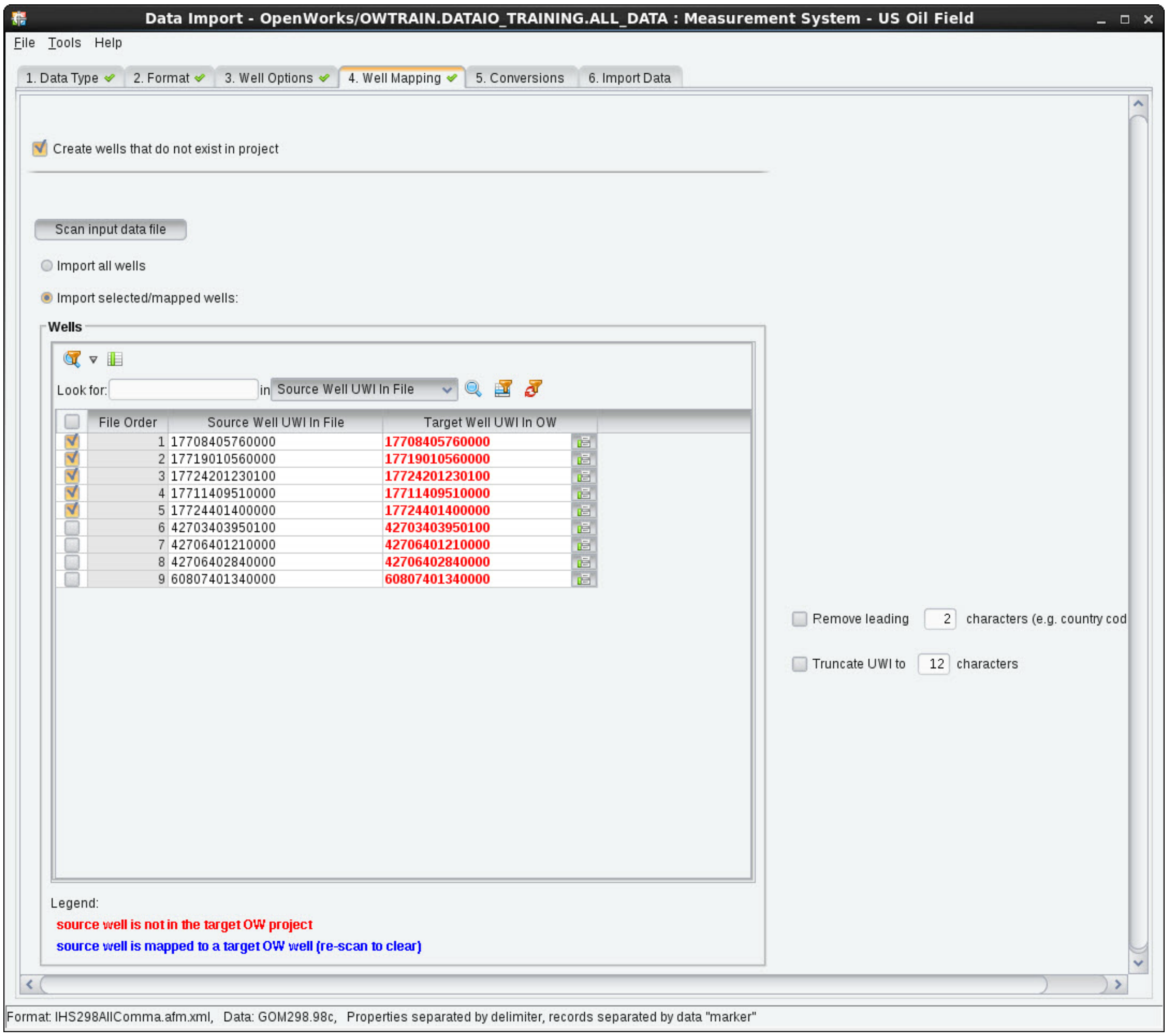


7. Proceed to the Well Mapping tab. The option to **Create wells that do not exist in project** is toggled on by default.

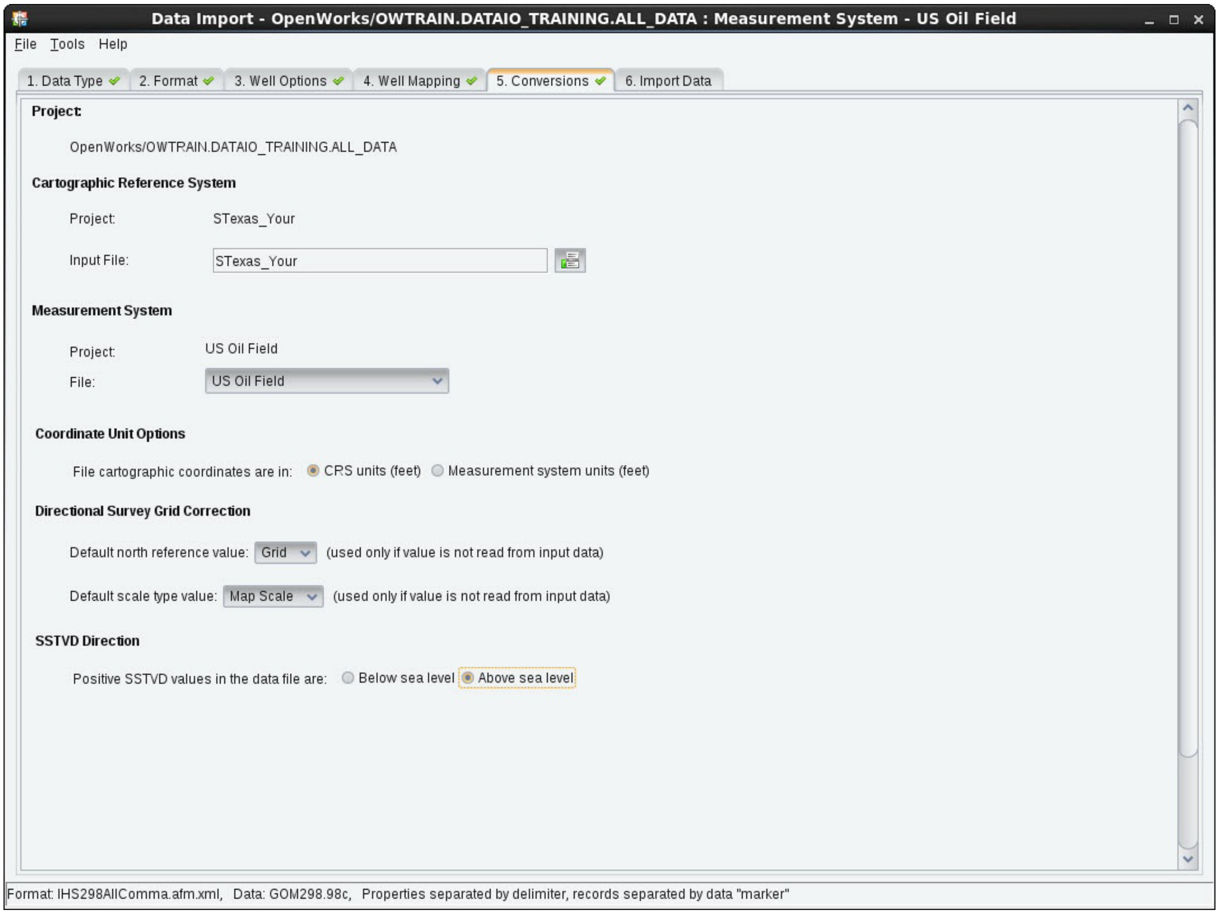
8. Click **Scan input data file** 

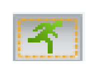
 to scan the file and map the wells in the data file to existing wells in the OW project database. Notice all of the Target Wells have a red font; these wells do not currently exist in the OW project but will be created upon import. Wells already in the OW project would display in blue font in the Target Well list.

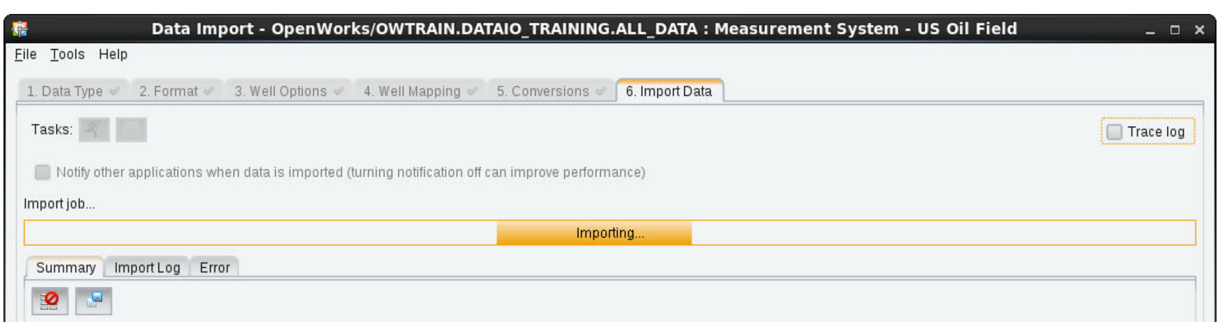
9. By default, the **Import all wells** option is toggled on, and all check boxes in the well list are marked. For this exercise, toggle the **Import selected wells** option, then check the boxes for the first five wells.



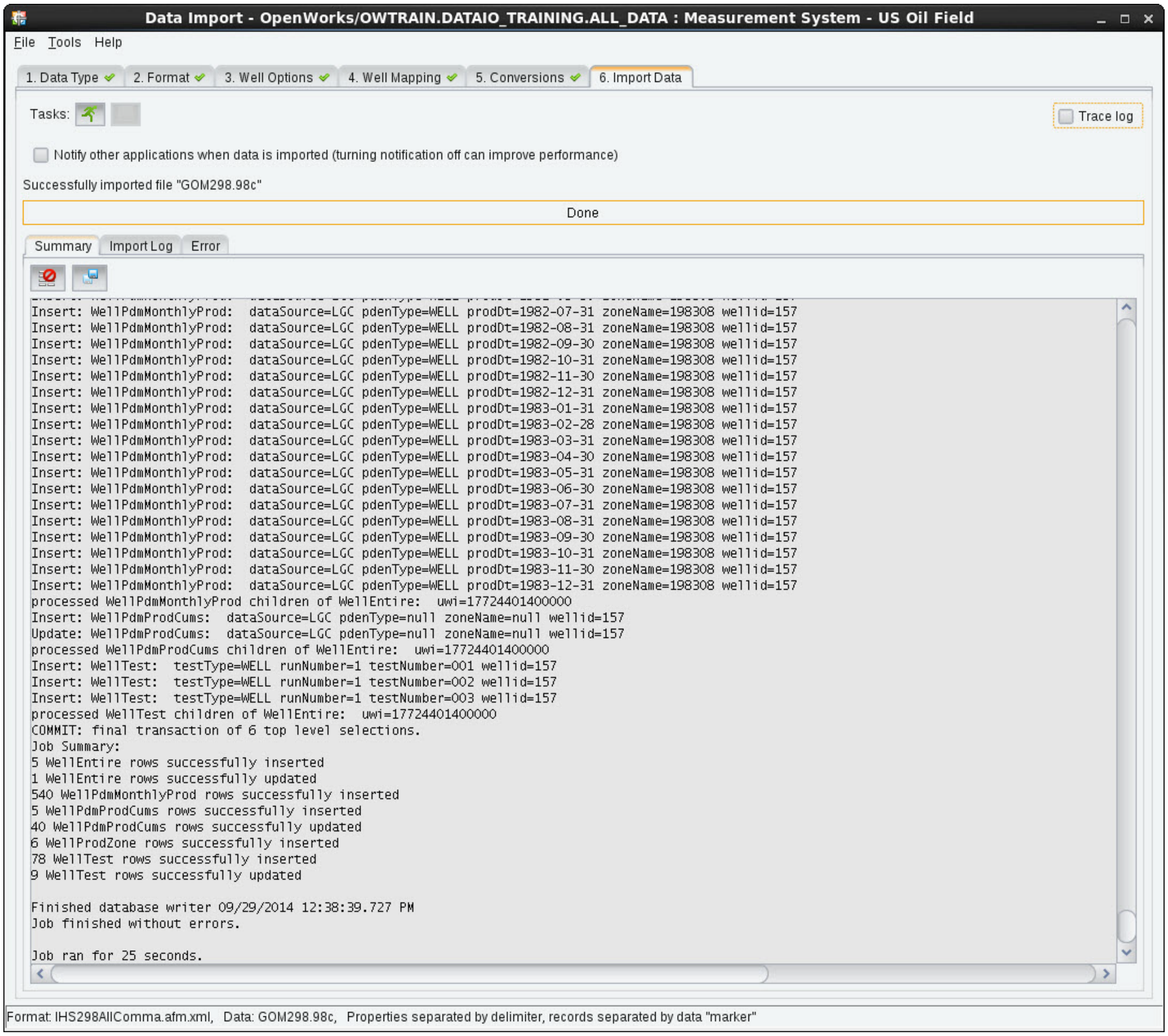
10. In the Conversion tab window, check your selection for the data CRS and set Positive SSTVD values to **Above sea level**. Accept the settings in the picture below:



11. In the Import Data tab window, click the **Run Import Job**  button to load the data file. A progress bar appears and the status line “Job running…” is displayed.

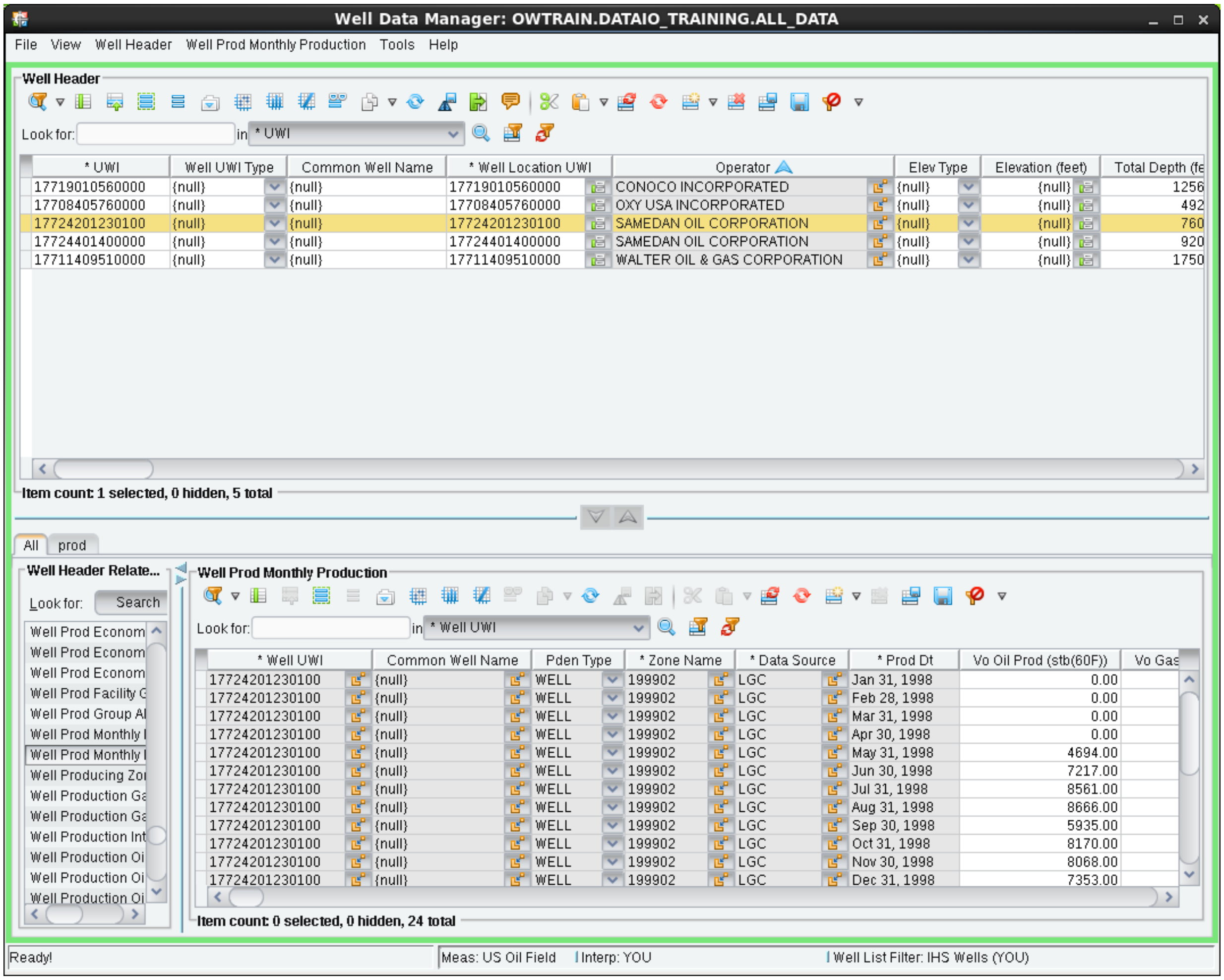


The Data Import tool continues to write to the Import Log after the import has completed; watch for the status line to display "Successfully imported file," then check the Summary, Import Log, and Error reports for data load information.



The report of a successful load in the Summary pane does not ensure that your data loaded completely; it is best practice to check the Import Log and to verify the imported data in the Well Data Manager.

12. Check your imported production data in Well Data Manager.



Appendix D
Loading Raster Logs

Raster logs are scanned depth-calibrated images of log curves. The new Data Import tool can load Raster logs into the OpenWorks database but they must be depth-registered logs.

Once loaded to OpenWorks, raster logs can be displayed along wellbores in Section, Correlation, and Cube views in Landmark's DecisionSpace Geosciences software. (Raster logs can be added to a session using Map view, but they will not display in a map.) Depending upon the file, raster logs may display in black and white, or color. They display in both depth and time domains provided your project has a velocity model.

Importing Raster Logs into OpenWorks

The Data Import tool can load Raster logs (depth-calibrated images of well logs) into an OpenWorks project. The following formats are supported: SIF, DRA, REG.

The image files (usually Tagged Image File format, or TIF, files) associated with these data are stored in the directory paths specified by your *owdir.dat* file. When raster log data is added to a session, the DecisionSpace Geosciences software looks for the TIF files in these locations in the following order:

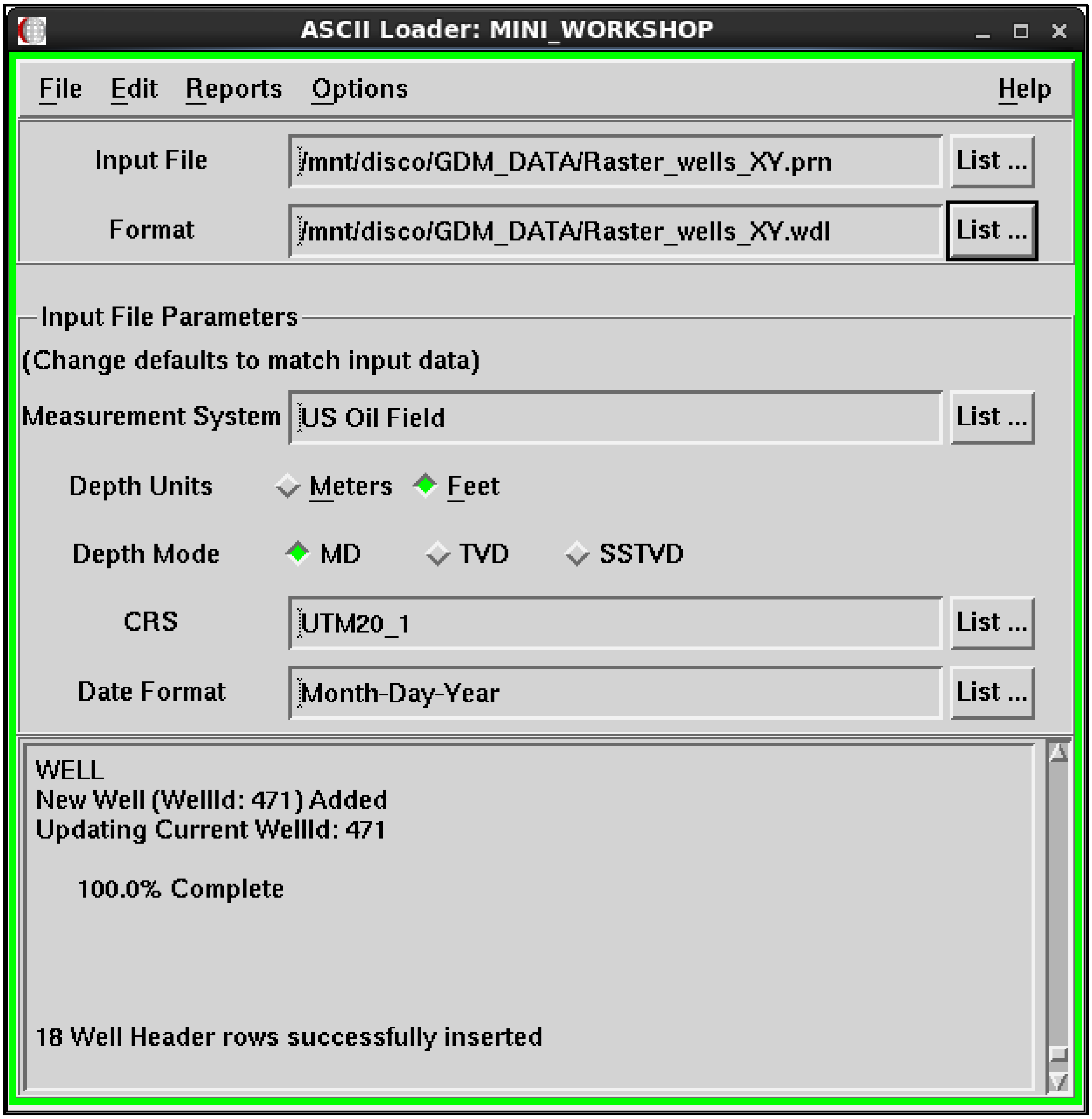
- In a folder (log_images) under the project database directory in your OW_PROJ_DATA location
- In a shared directory (SHARED_LOG_IMAGES). The shared directory may hold raster log files from multiple project databases

The raster logs loaded by the Data Import tool must contain well UWIs but might not have well header information such as CRS, XYs or LatLongs. It is best practice to have valid wells in the OpenWorks database prior to loading the raster logs for those wells.

Exercise-1: Loading Raster Logs

1. Set the Openworks project to **MINI_WORKSHOP**.

2. Use the ASCII Loader to import the well header information for wells with raster logs. Select the input data and format files shown below, and load the well data.

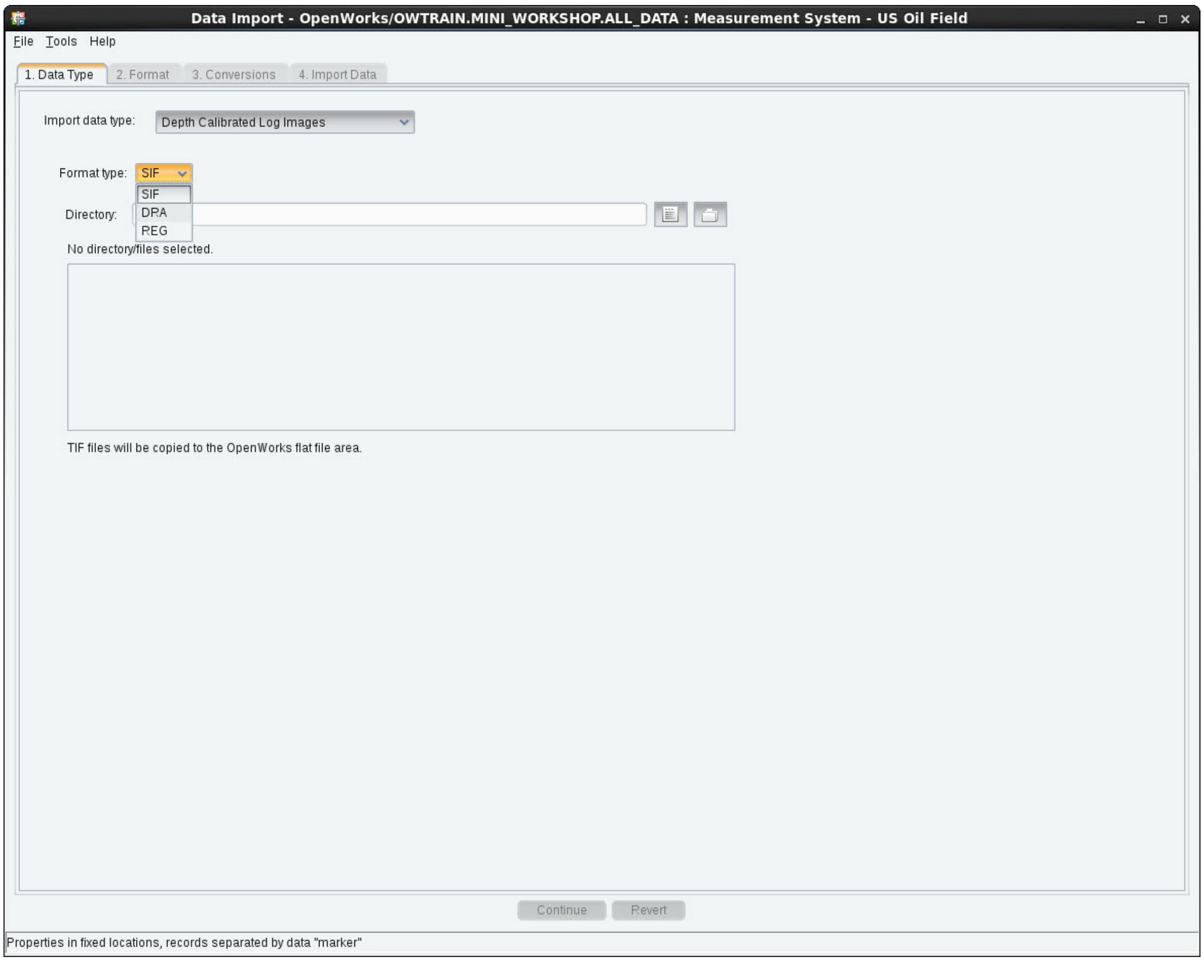


3. Next load the raster logs. Open the Data Import tool from the OpenWorks command menu by selecting **Data > Import > Data Import**.

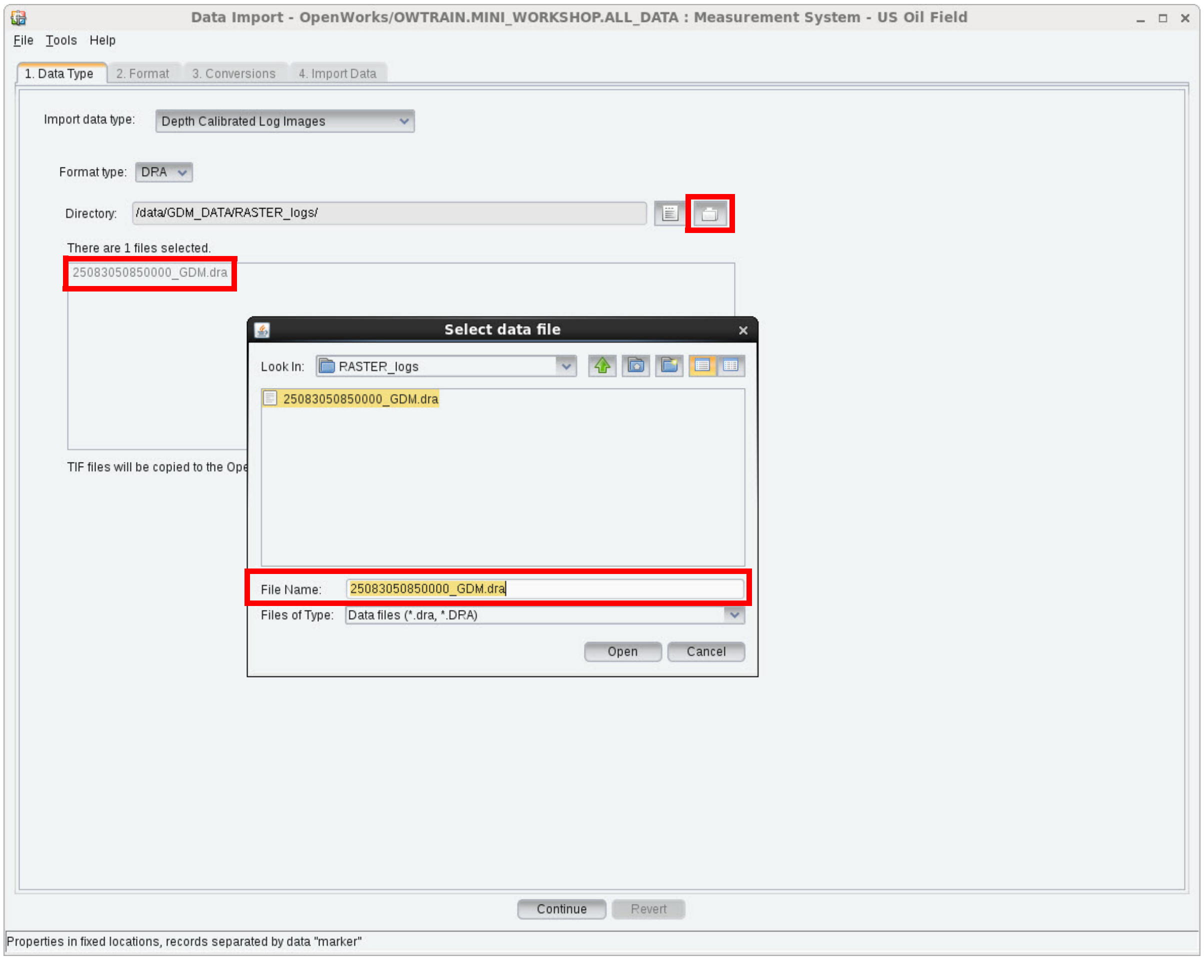
4. The Data type tab window will be active by default. Select **Depth Calibrated Log Images** from the **Import data type** drop-down menu.

   The Data Import tool supports three formats for depth-calibrated log images:

   - SIF (from A2D Technologies)
   - DRA (from GeoGraphix software)
   - REG (from MJ Systems).

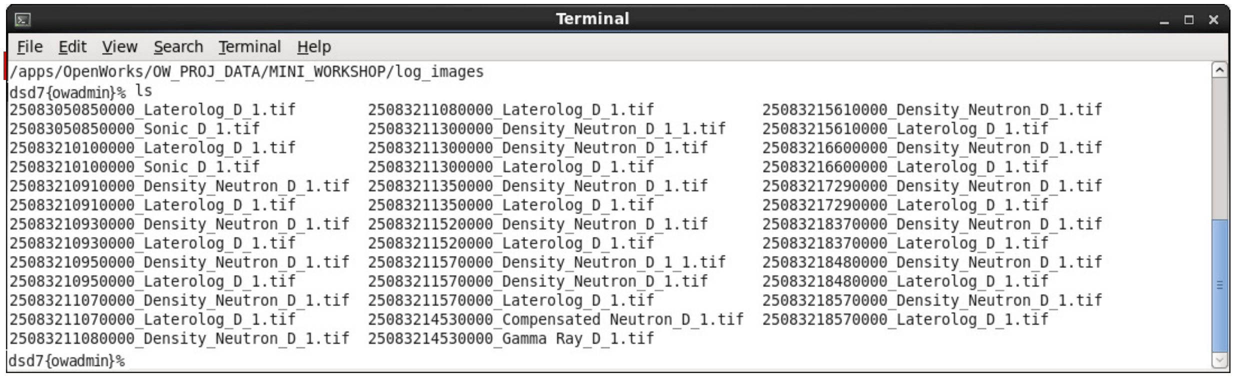


5. Select **DRA** for the format type of the raster data. Browse to, and select, the **data folder** containing the raster logs you want to load in the job, **RASTER_logs.**

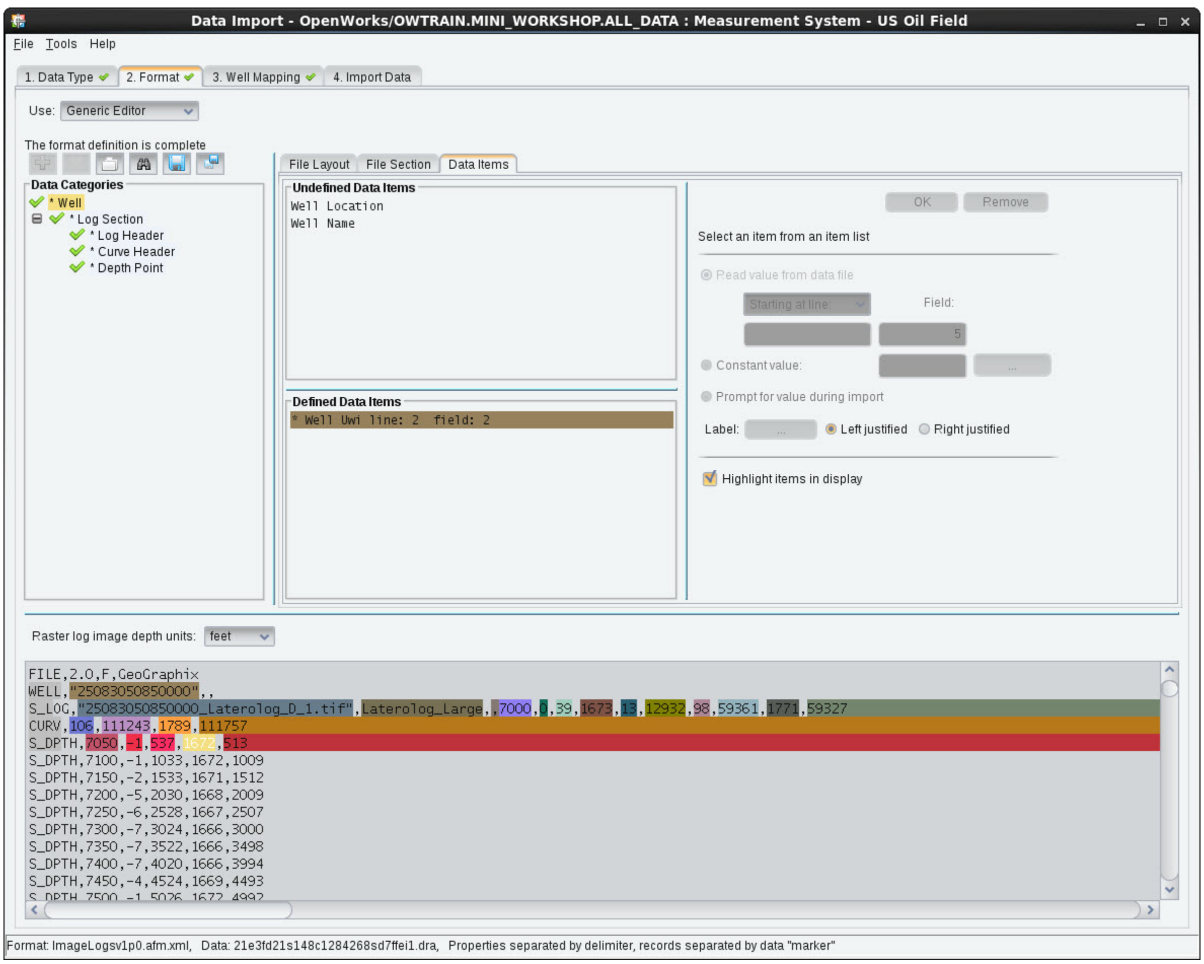


6. Click **Continue** to finalize the data selection. All TIF files referenced by the DRA file will be copied from the input data directory to the log_images folder (path/OW_PROJ_DATA/ <project_name>/log_images). This is the first location where

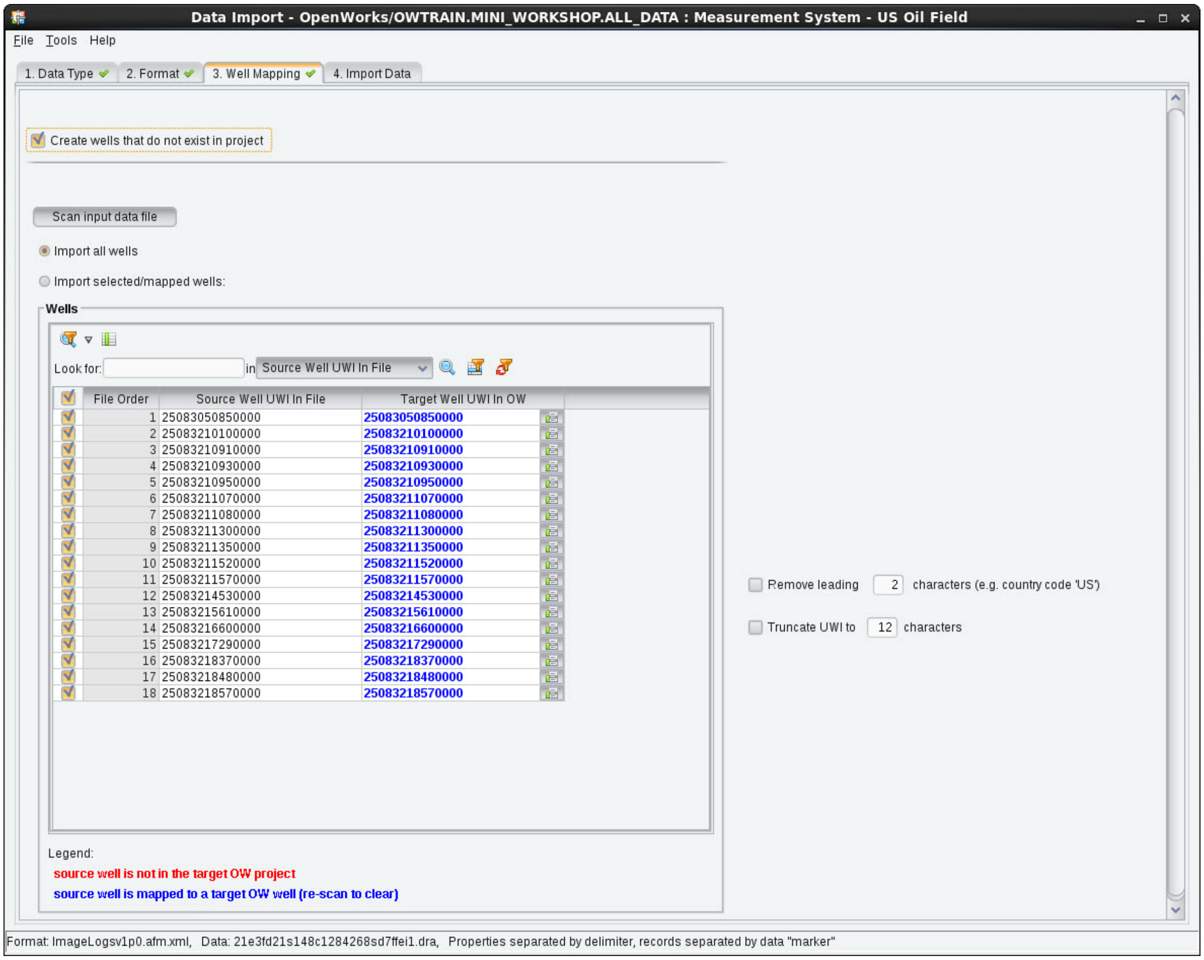
DecisionSpace Geosciences software looks for the TIF files when raster log data are added to a session.



7. Examine the input DRA file and the data items defined by the default format file in the **Format** tab window of the Data Import tool.

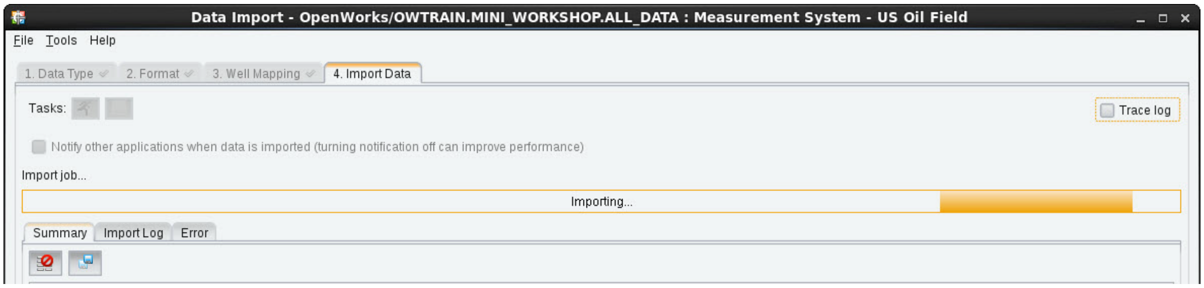


8. Accept the default format and proceed to the Well Mapping tab. **Create wells that do not exist in Project** is toggled on by default. Click the **Scan input data file** Scan input data file icon to display wells from the input data file.

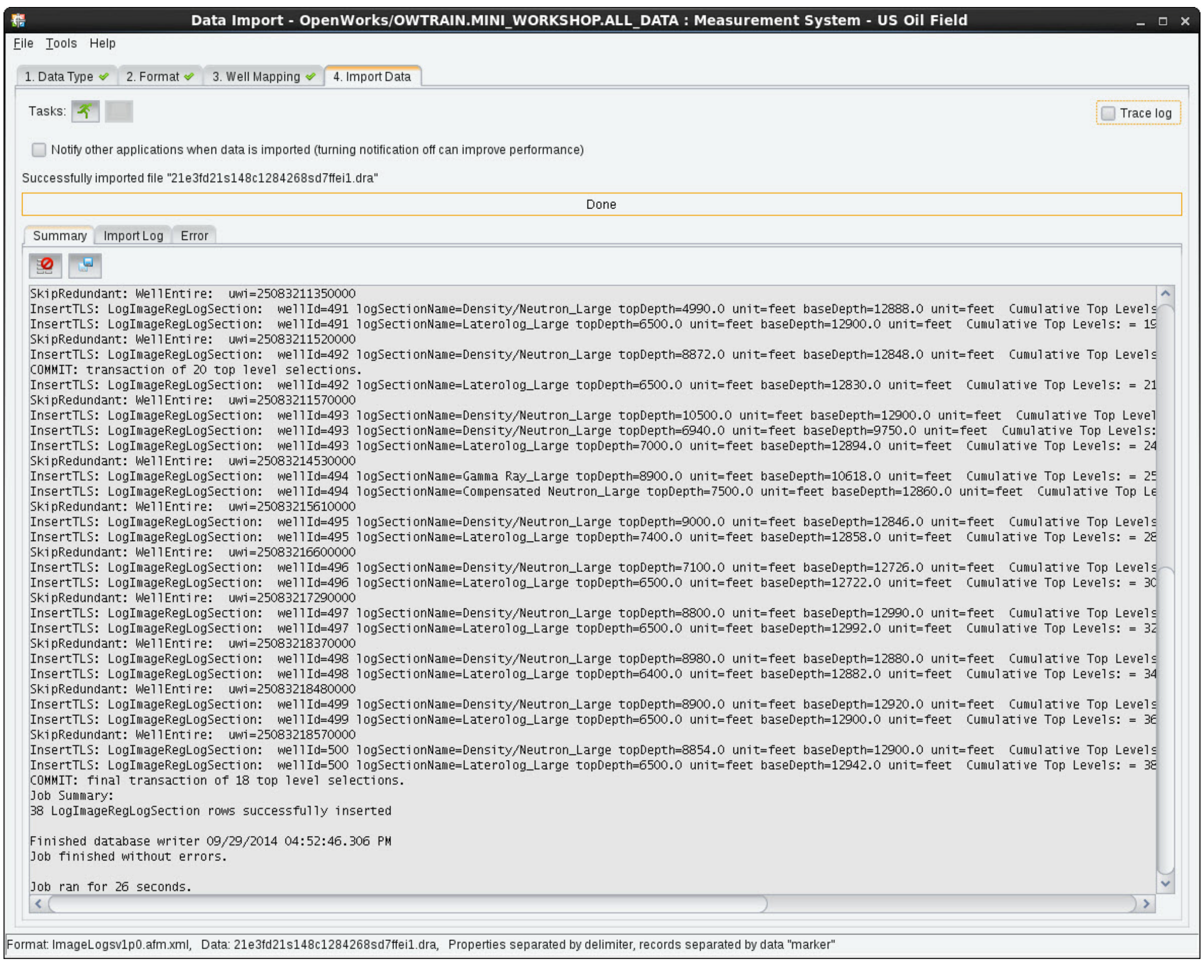


The wells listed under the column heading *Target Well UWI in OW* are shown in blue font, which indicates these are valid wells in the OpenWorks database.

9. Proceed to the Import Data tab window and click the **Run Import Job** icon to load the raster data. A progress bar appears and the status line "Job running…" is displayed. The **Run Import Job** icon is red for the duration of the load process.

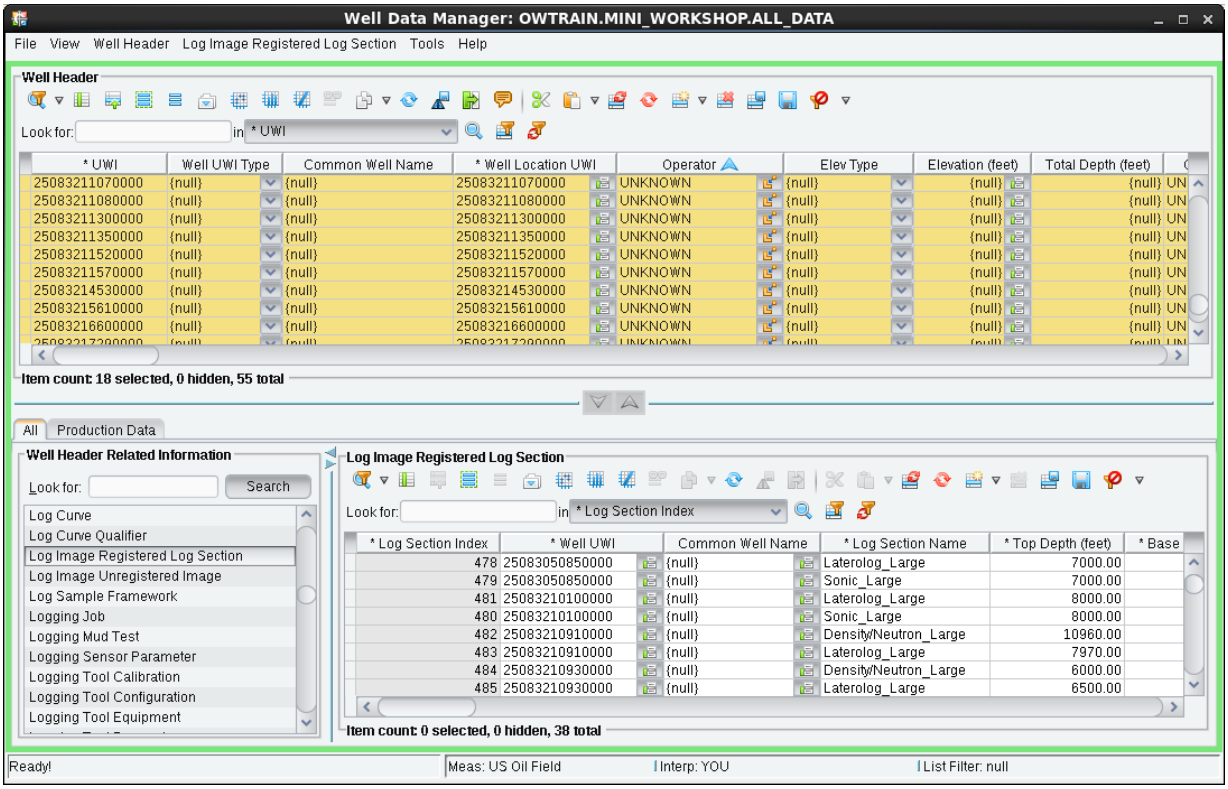


10. The load results will be displayed in the Summary tab window.

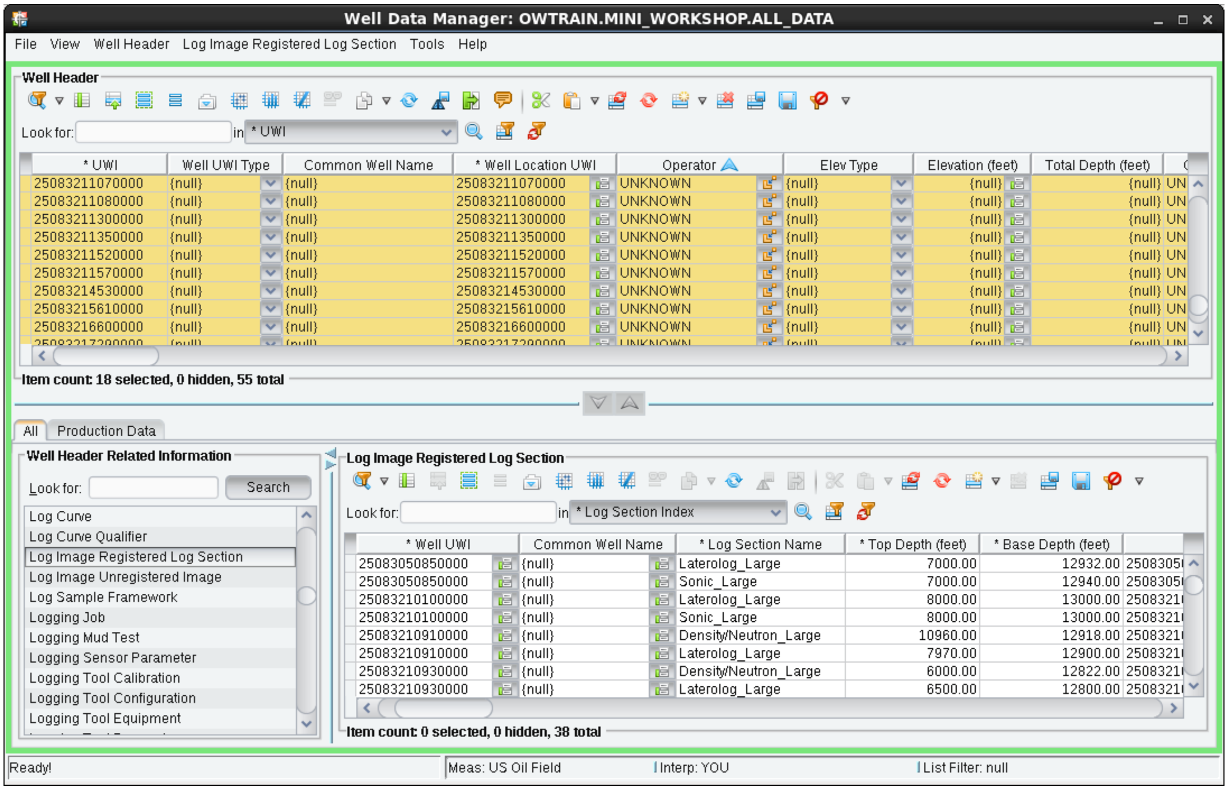


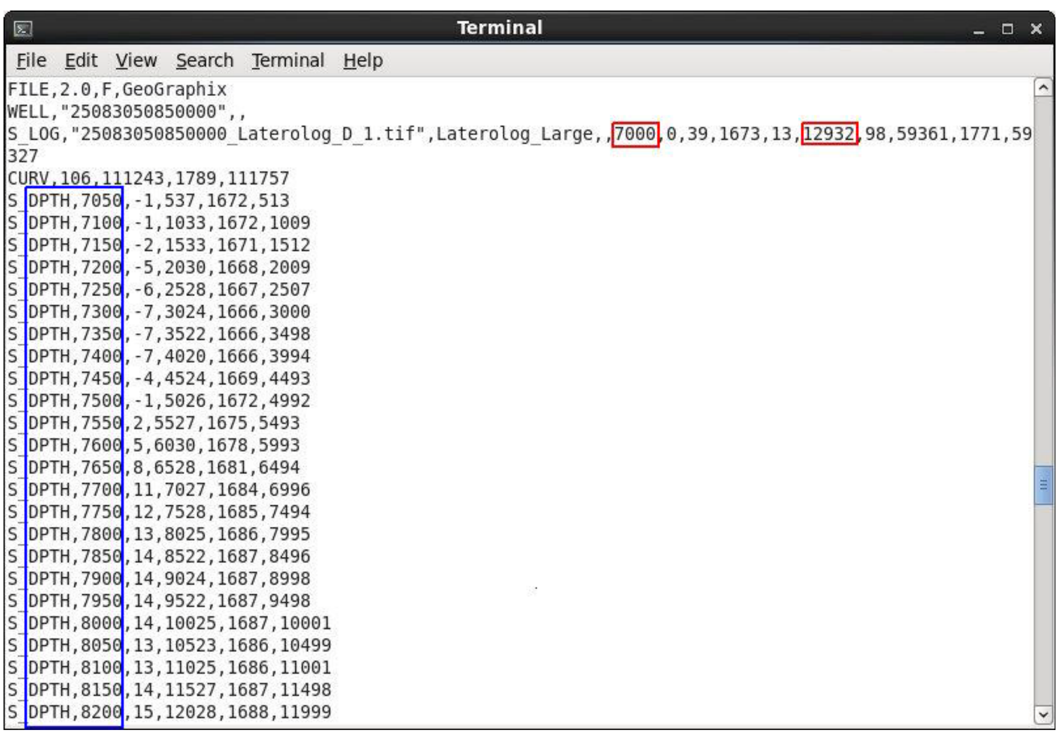
Exercise-2: Verify the Raster Data Load in WDM

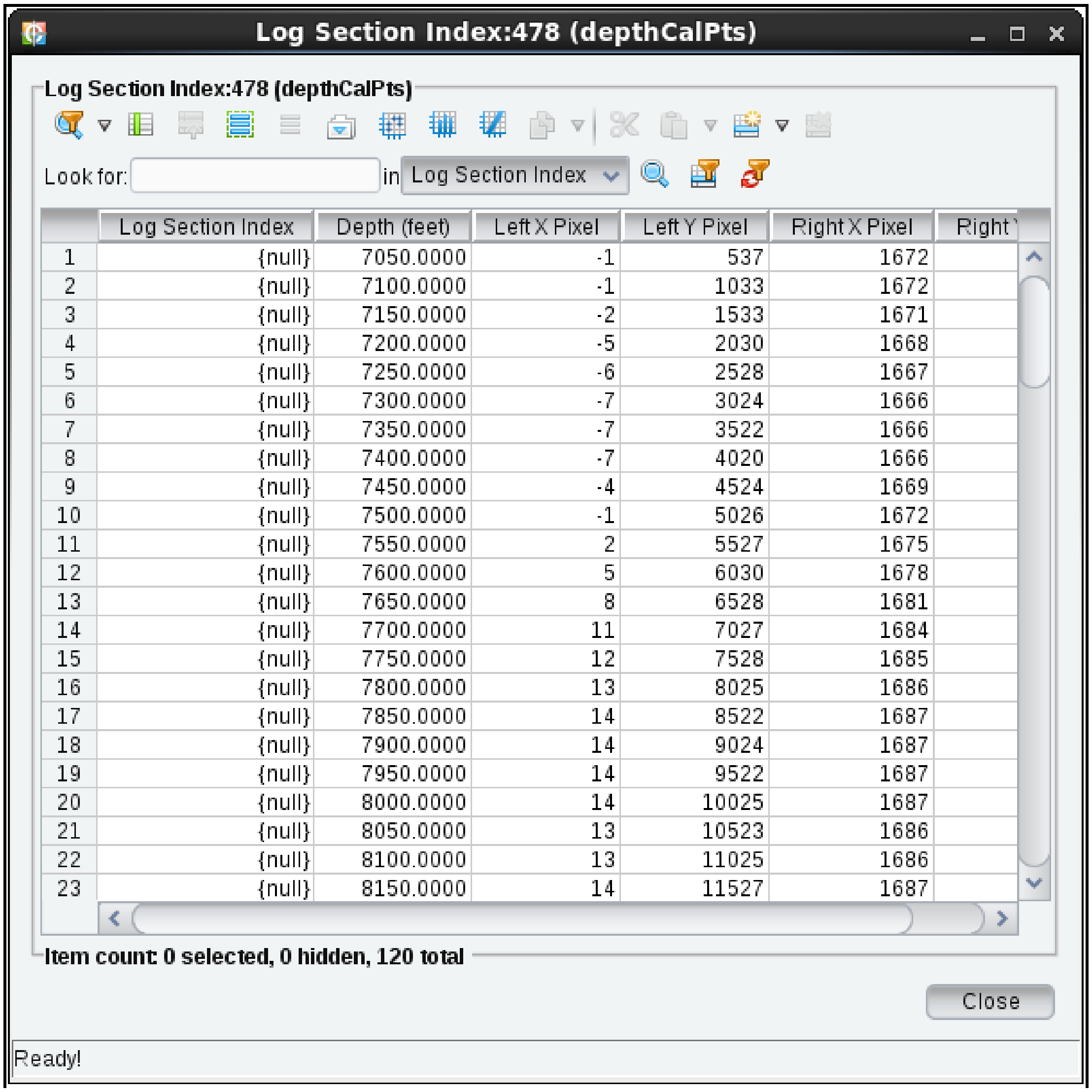
1. Open Well Data Manager and check for the imported log images.



2. Verify that the Top Depth, Base Depth, and the depth-calibrated points in Well Data Manager are in agreement with your input data files.



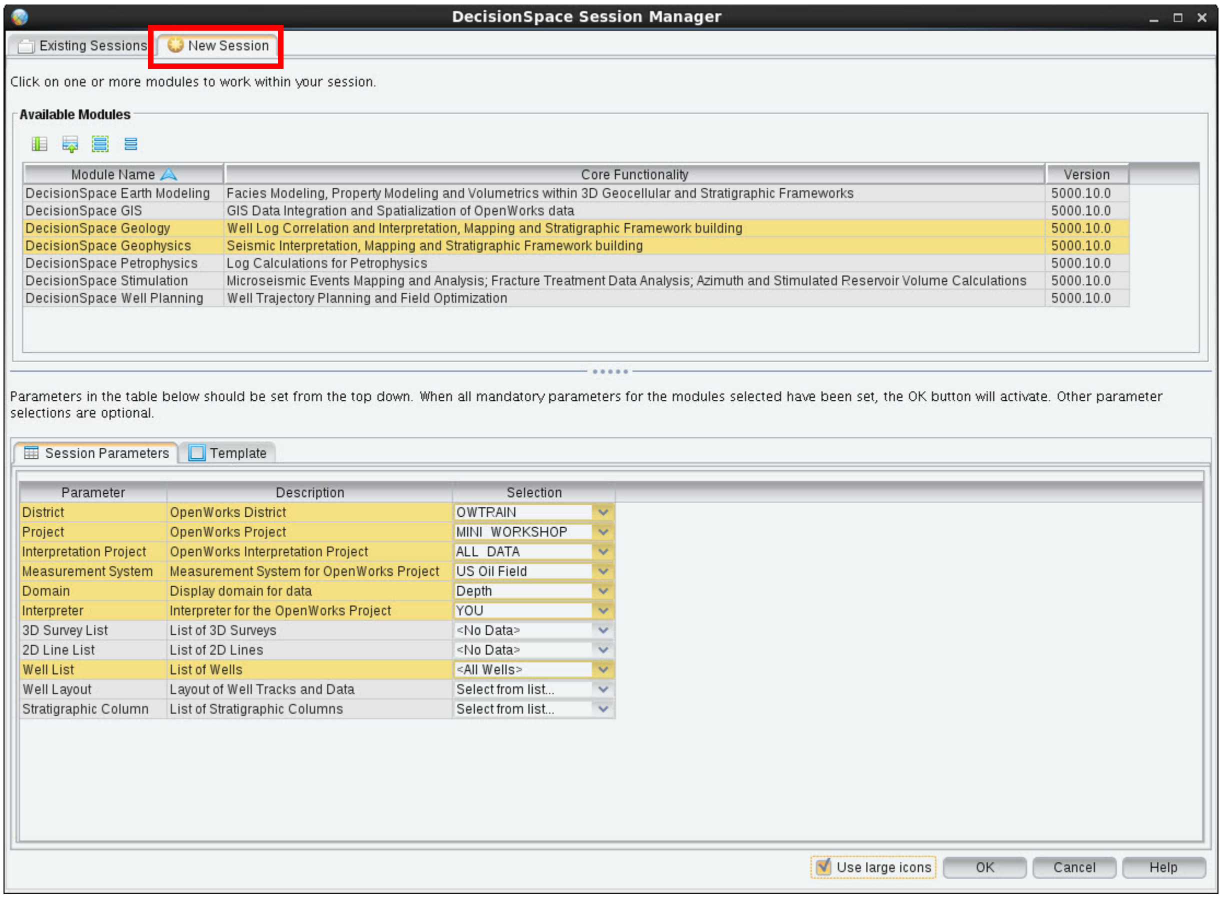




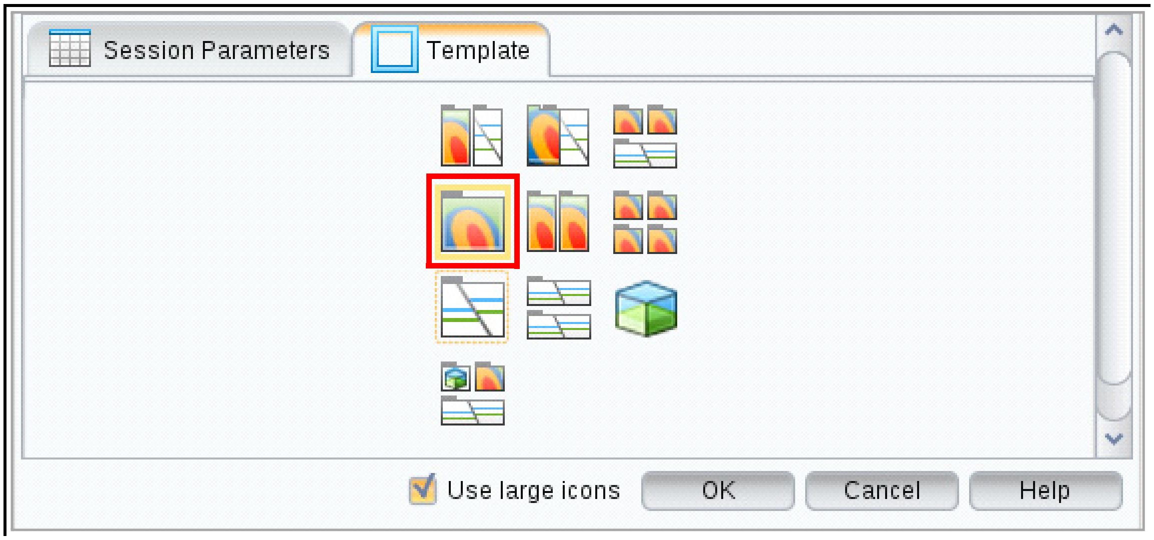
	Log Section Index	Depth (feet)	Left X Pixel	Left Y Pixel	Right X Pixel	Right Y
1	{null}	7050.0000	-1	537	1672	
2	{null}	7100.0000	-1	1033	1672	
3	{null}	7150.0000	-2	1533	1671	
4	{null}	7200.0000	-5	2030	1668	
5	{null}	7250.0000	-6	2528	1667	
6	{null}	7300.0000	-7	3024	1666	
7	{null}	7350.0000	-7	3522	1666	
8	{null}	7400.0000	-7	4020	1666	
9	{null}	7450.0000	-4	4524	1669	
10	{null}	7500.0000	-1	5026	1672	
11	{null}	7550.0000	2	5527	1675	
12	{null}	7600.0000	5	6030	1678	
13	{null}	7650.0000	8	6528	1681	
14	{null}	7700.0000	11	7027	1684	
15	{null}	7750.0000	12	7528	1685	
16	{null}	7800.0000	13	8025	1686	
17	{null}	7850.0000	14	8522	1687	
18	{null}	7900.0000	14	9024	1687	
19	{null}	7950.0000	14	9522	1687	
20	{null}	8000.0000	14	10025	1687	
21	{null}	8050.0000	13	10523	1686	
22	{null}	8100.0000	13	11025	1686	
23	{null}	8150.0000	14	11527	1687	

Exercise-3: Verify the Raster Data Load in DSG

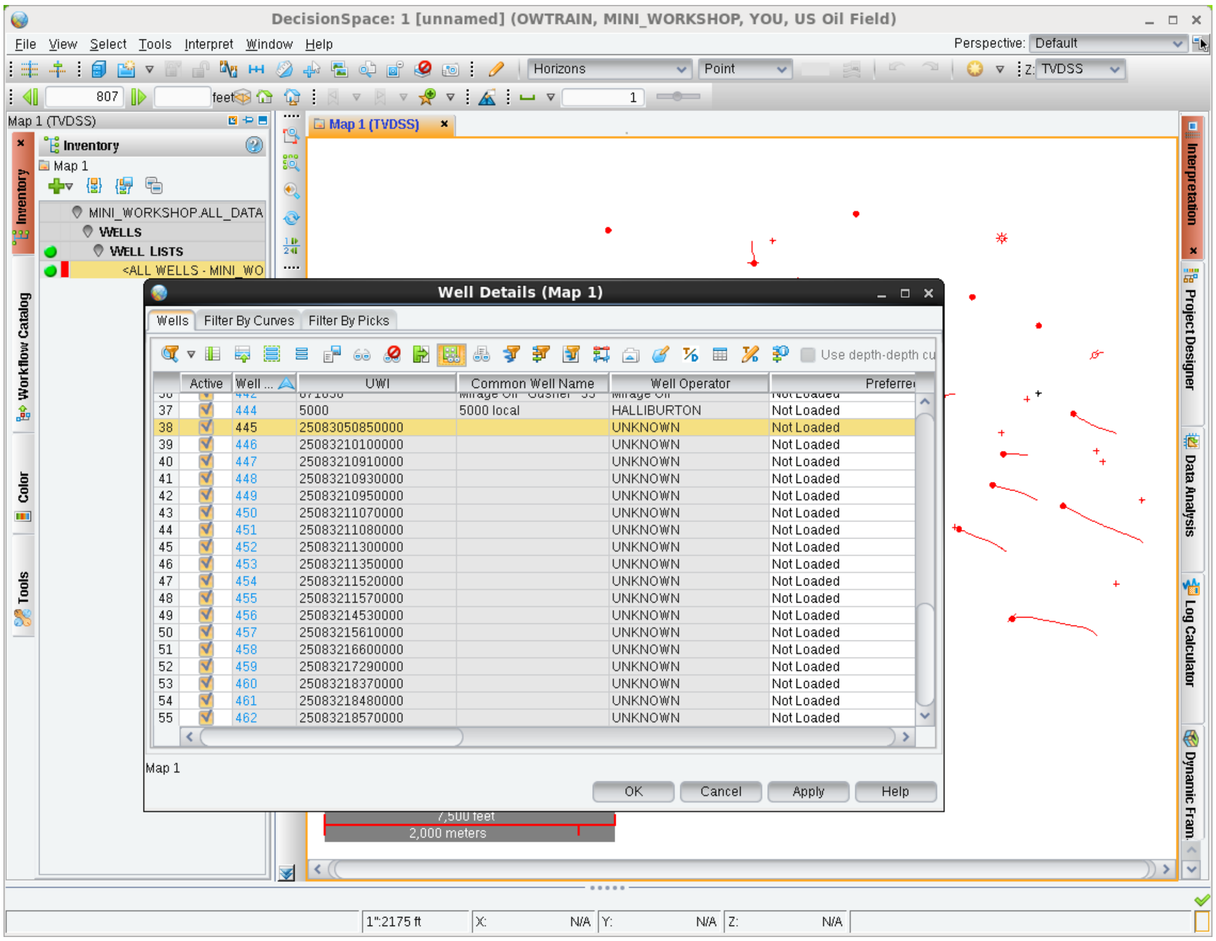
1. Launch DecisionSpace Geosciences software from the OpenWorks Command Menu by clicking **Applications > DecisionSpace Geosciences**. Start a new session, and select the parameters shown below.



2. In the Template tab window, highlight the Map view only. Click **OK**.



3. In the Map view Inventory, **MB3** on **<ALL WELLS – MINI_WORKSHOP>** to open the **Well Details** dialog box from the menu.

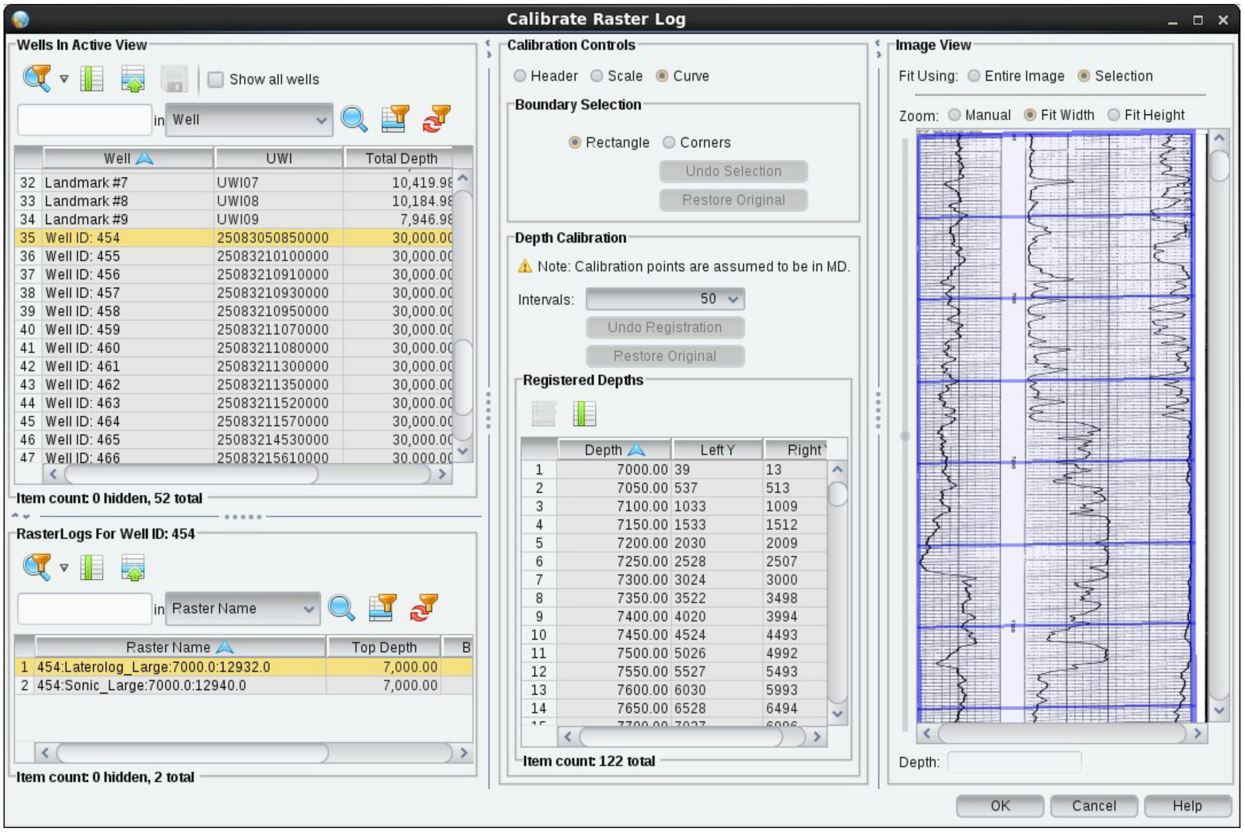


Select the well with UWI 25083050850000. Toggle the **Highlight selected well** icon to locate that well (displayed with a white well symbol) on the Map.

4. **MB3** the well in the Map view to open a drop-down menu of various well data options. Select **Add Well Data > Calibrate Raster Log**.

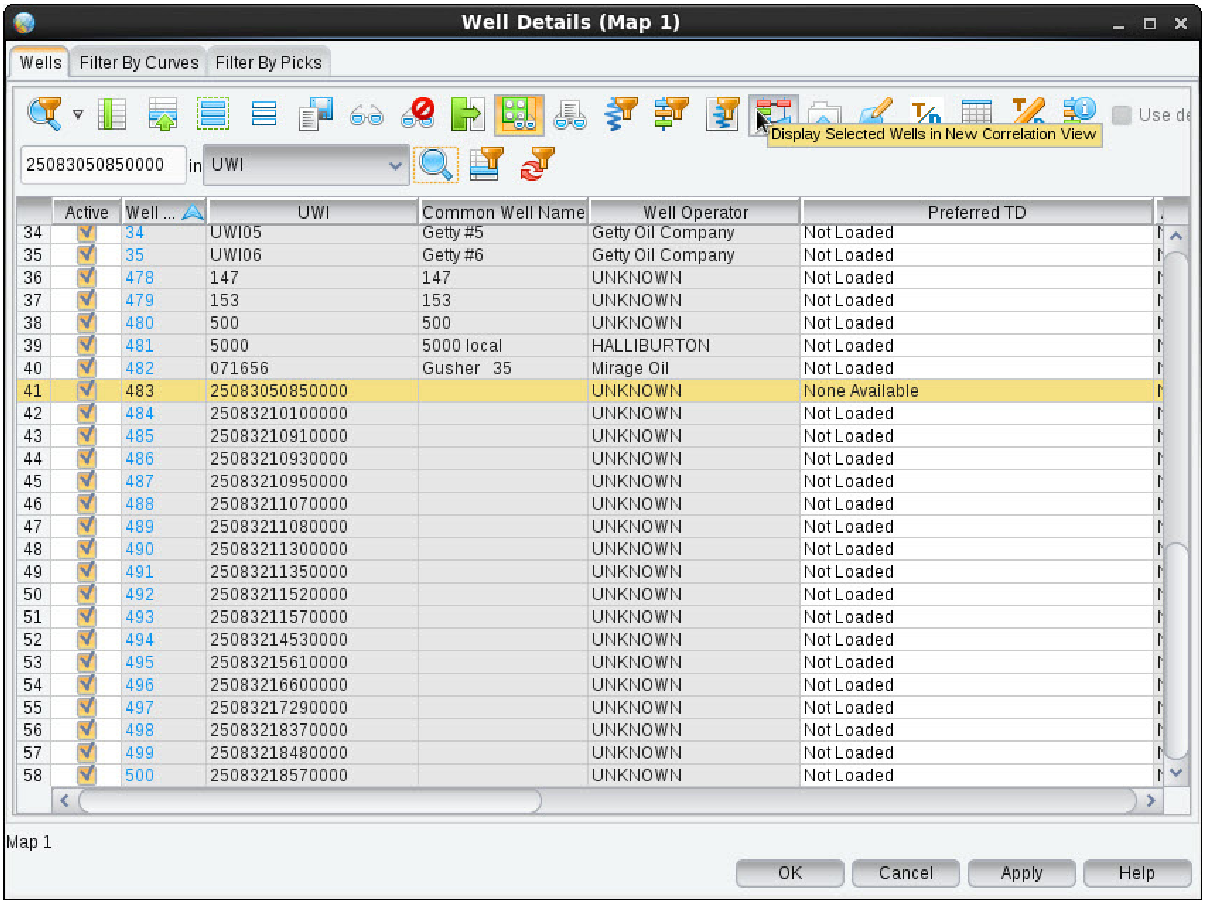
5. In the Calibrate Raster Log dialog box, highlight the well with **UWI 25083050850000** in the Wells in Active View pane. Select its

associated **Laterolog raster log** from the lower pane, as shown here.

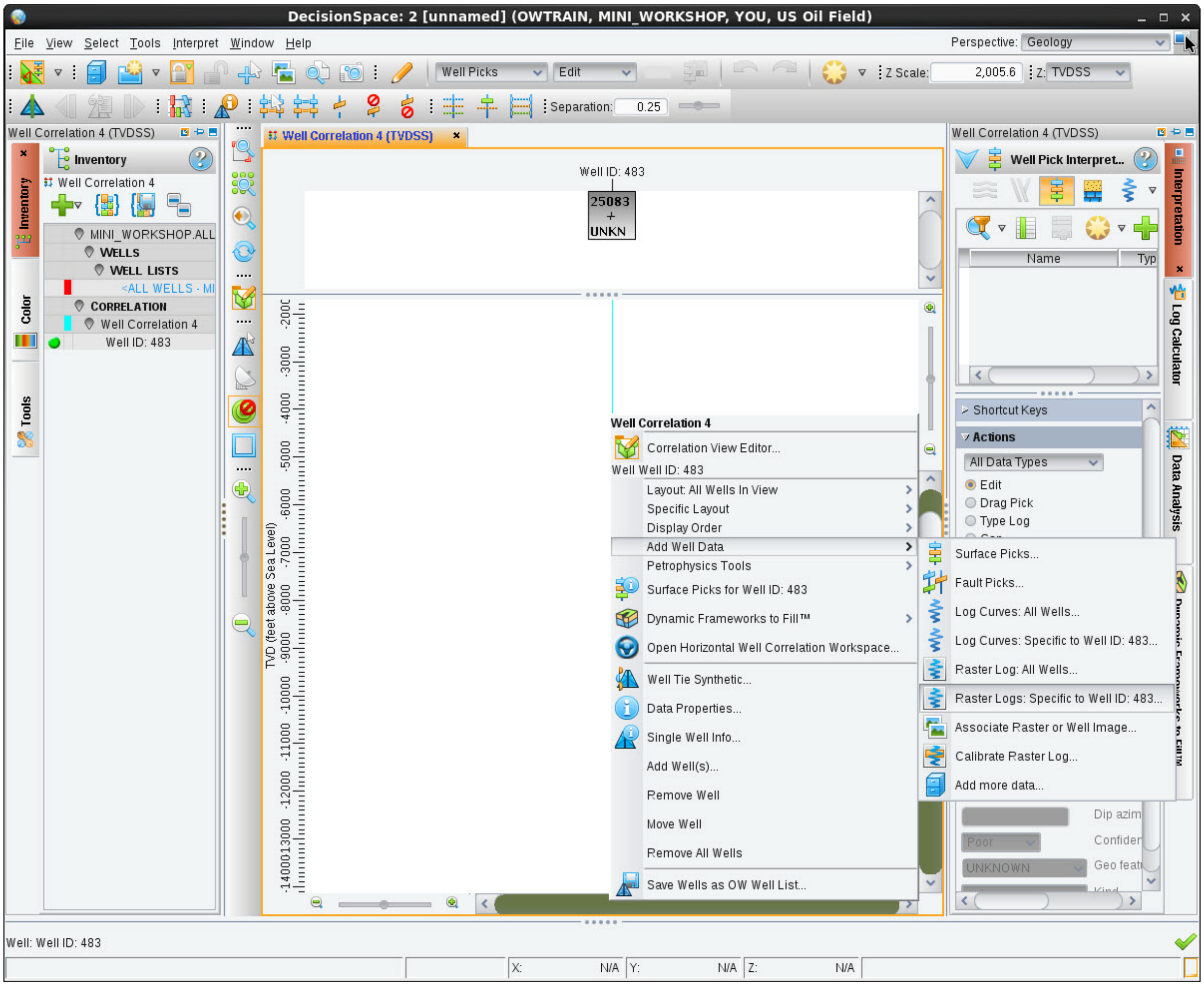


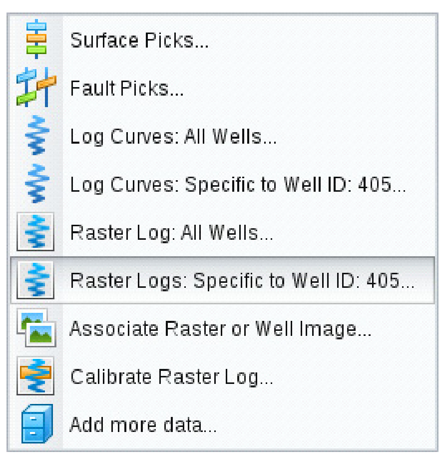
6. Examine the depth registration in the center **Calibration Controls** pane and the log image in the **Image View** pane. You can verify other wells and their raster logs in this Calibration dialog window.

7. The Well Details dialog box should still be open. Highlight the well with **UWI 25083050850000**, and click the **Display Selected Well in new Correlation View** icon as shown below.

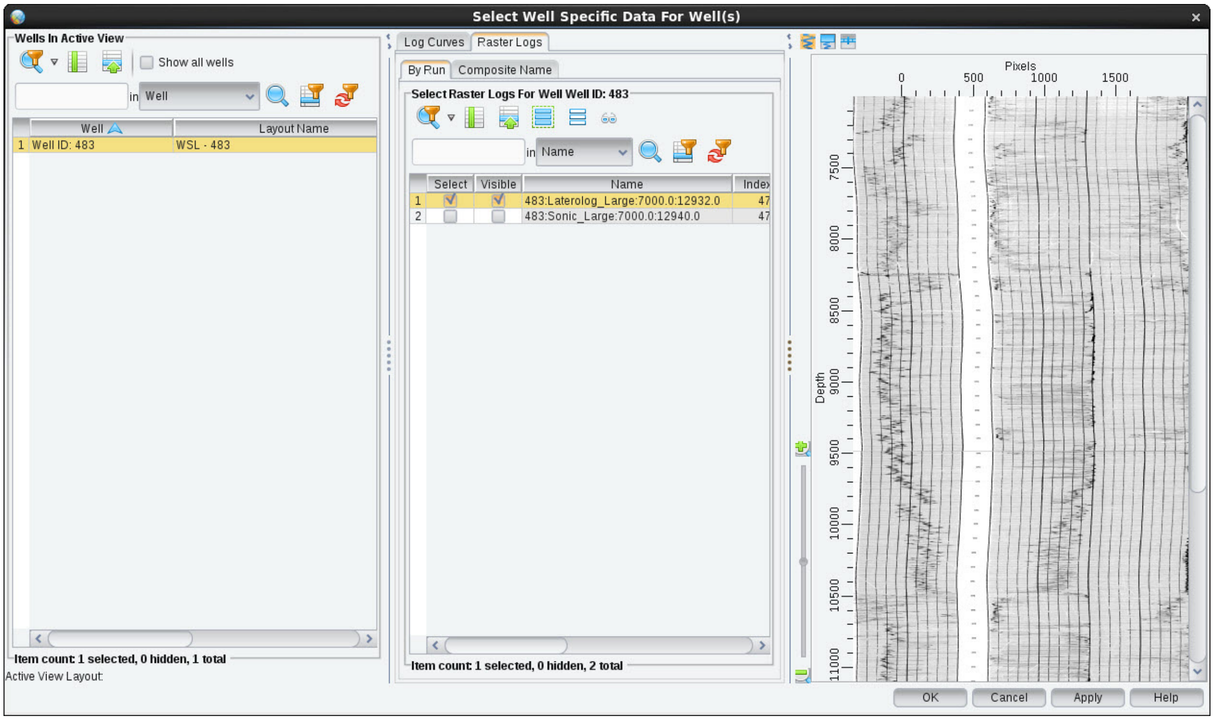


8. At the Well Correlation window, **MB3** the blue well borehole to open a drop-down menu. Select **Add Well Data > Raster Logs: Specific to Well ID:**





9. The Select Well Specific Data dialog box lists the well and its raster logs. Click the **checkboxes** to select and make the **Laterolog** visible. The log image is immediately displayed in the next panel as shown below.



10. Once you click the **Apply** button, the raster log is also displayed along the well bore in the *Well Correlation* window. Zoom in on the image to verify that the top and base depth values agree with the values you loaded. Be sure to set the Z mode to **Well TVD** to have the correct Z scale display.