Chapter

5

Time-Depth Horizon Conversion

In this section a time horizon will be converted into a depth horizon using the **Depth Map by Shared T-D Chart**. This method uses a singe T-D Chart that is shared with all the wells being used in the depth conversion. A velocity value is calculated at the intersection of the time horizon or time grid at the well borehole. The shared T-D chart is used to determine the velocity value at the intersection. (**Depth/Time = Velocity**). A velocity grid is generated and multiplied by the time horizon resulting in a depth horizon or gird (**Depth = Velocity x Time**).

1. Select **Tools > Depth Conversion > Depth Map by Shared T-D Chart** (Figure 5.1).

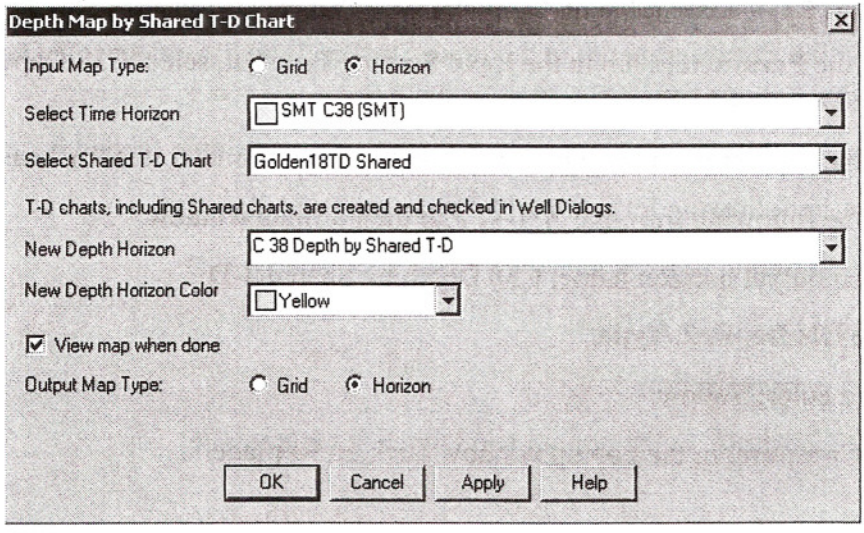

Figure 5.1 — Depth Map by Shared T-D Chart dialog box

2. In the dialog box that opens, enter the information as shown in Figure 5.1.

3. Click **OK**.
4. In the **Base Map** display the Color Bar. Note the values are in Depth but do not indicate subsea values. We will use the Extended Math Calculator to make the depth values subsea.
5. Select **Tools > Calculators > Extended Math Calculator** (Figure 5.2).

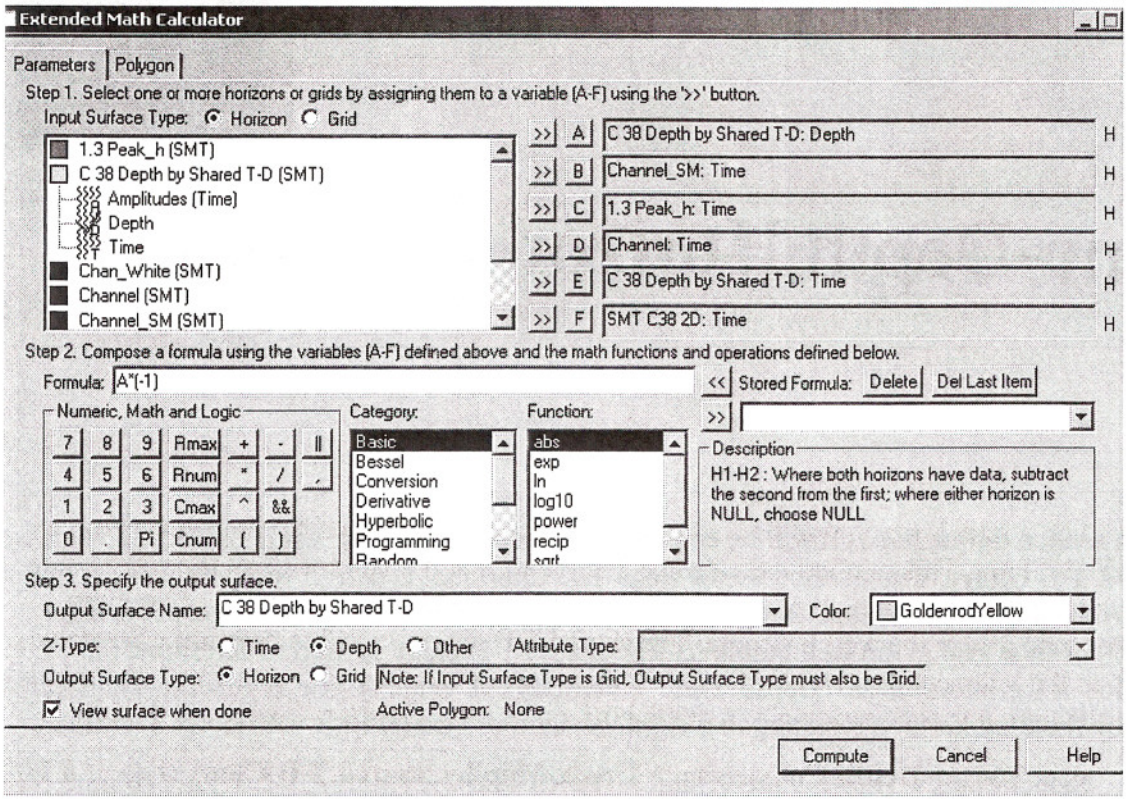

Figure 5.2 — Extended Math Calculator dialog box with Parameters tab active

6. Under the **Parameters** tab in the Input Surface Type list, select C38 Depth by Shared T-D and toggle ON, **Depth** as shown above.
7. Click the >> button and assign the Depth horizon attribute to the **"A"** parameter.
8. Enter the following formula; **A*(-1)** into the Formula window.
9. Enter an output horizon name; C38 Depth by Shared T-D.
10. Toggle ON **Depth Z-Type**.
11. Select a color; Yellow.
12. Click **Compute**. In the pop up window click on **Replace**.

Contour the Depth Horizon

Before making the contour map assign the C38 fault polygon set to the new C 38 depth horizon.

1. Select **Faults > Fault Polygon Management > Properties** tab.
2. In the **Fault Polygon Management** dialog box that opens, click the down arrow and select the Fault Polygon Set Name for the C38 horizon.
3. Under the Associated Horizons list, highlight the C 38 Depth by Shared T-D horizon.
4. Click **OK**.

Note: If the fault polygons do not display on the **Base Map** make sure the Main and Minor faults are checked on in the **Project Tree**.

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5. In the **Base Map** select the **Compute Contour** icon  .
6. In the **Compute Contour** dialog box, under the Horizons tab select the C 38 Depth by Shared T-D horizon and Depth as the Data Type.
7. Accept the default Parameters settings and click **OK**.
8. (Optional) Contours can be edited using the Contour toolbar (**View > Toolbars > Contours**).
9. Save the depth contours by selecting from the main menu bar, **Contours > Save Active Contour As.** Your map should look similar to Figure 5.3.

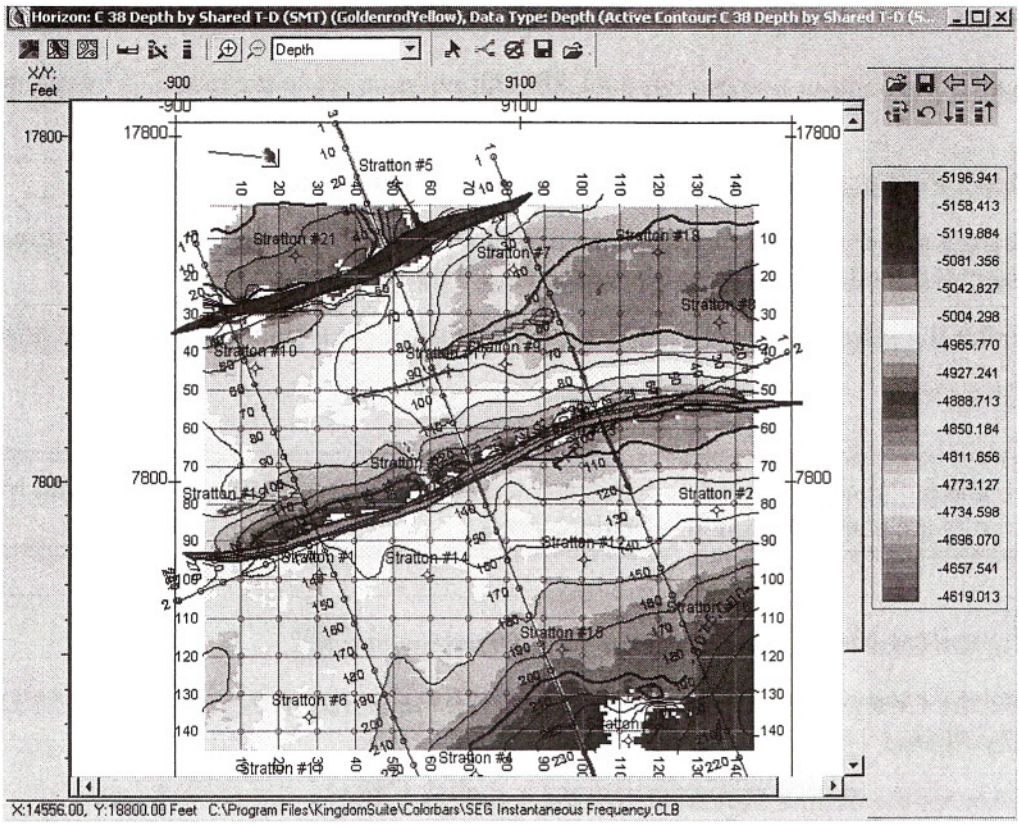

Figure 5.3 — C 38 depth horizon, fault polygon set and depth contours

Display Contours and Seismic Amplitudes

Amplitudes of the C38 reflection event can be superimposed on the depth structure.

1. Display the C38 Amplitudes on the **Base Map** by clicking the Select icon on the **Base Map** icon bar.
2. Click the Horizons tab and highlight the C38 Depth by Shared T-D horizon and Amplitudes for the Data Type. Click **OK**.
3. With the C38 amplitudes displayed on the **Base Map**, drag and drop the C38 Depth contours from the **Project Tree** onto the **Base Map**.

   This is an excellent way to demonstrate the correlation of amplitude anomalies to structure.

Suggestions

- Use the Correlation polygon to correlate horizons across faults on seismic sections. From the seismic section select **Tools > Correlation Polygon....** Digitize an area on the side of the fault where the horizon has been digitized. Double click to close the fault polygon. You can then move the polygon with the left mouse button, place the polygon on the other side of the fault, and continue picking the horizon after the correlation has been established.
- Use the Planimeter Polygon tool to measure areas on a **Base Map**. This is available under **Tools > Planimeter Polygon.**
- To construct a consistently picked fault surface, activate a fault segment on a seismic line then copy the fault by clicking on **Ctrl C.** Click on the arrow to display the next seismic line then click on **Ctrl V** to paste the fault on the new line. You can now position the fault by holding the control key down and moving the fault on the new seismic line.
- Horizons are associated with surveys. If the survey is not displayed, you will not be able to display the horizon.
- Faults can be picked on time slices. The coherency data type is especially helpful in identifying faults on time slices.

Appendix

A

Speed Keys

Note: This feature is available with a 2dPAK, 3dPAK, or 2d/3dPAK license.

Speed keys are context sensitive short cuts to avoid selecting frequently used items in menu bars. Speed Keys are keyboard keys for fast switching. For horizon picking in vertical seismic displays, the Speed Keys are as follows.

- **M** selects (M)anual mode
- **F** selects (F)ill mode
- **H** selects (H)unt mode
- **E** selects (E)rase picks mode
- **P** selects (P)eak phase
- **T** selects (T)rough phase
- **N** selects zero crossing (N)egative to positive
- **O** selects zero crossing p(O)sitive to negative

For vertical section displays, the Speed Keys are as follows:

- **F4** resets the display amplitude.
- **F5** raises the display amplitude.

- **F6** lowers the display amplitude.
- **F7** switches picking from the currently active fault to the currently active horizon.
- **F8** switches picking from the currently active horizon to the currently active fault.
- **F9** starts the zoom select operation.
- **F10** unzooms to the previous zoom scale.
- **U** is the flatten/Unflatten toggle for a vertical display.

The following Speed Keys are used to turn On /Off the listed items.

Ctrl H On/Off key for Horizon Labels.

Ctrl F On/Off key for Fault Labels.

Ctrl G On/Off key for Grid Labels

L On/Off key for all Log Curves

Ctrl L On/Off key for Lithology Pattern

Appendix

B

Context Sensitive Arrow Keys

Note: This feature is available with a 2dPAK, 3dPAK, or 2d/3dPAK license.

Vertical and horizontal arrow keys are used when incrementing through 3D seismic displays. The four arrow keys (up, down, left and right) are for vertical and horizontal section displays. For line and crossline displays, the arrow keys move in the context of the direction of the line.

- Left arrow key moves a vertical line to the left.
- Right arrow key moves a vertical line to the right.
- Up arrow key moves a horizontal line up.
- Down arrow key moves a horizontal line down.

For the four ambiguous cases (like pressing the left arrow key for a horizontal line), the left arrow key is equivalent to down and the right arrow key is equivalent to up.

For an arbitrary line, the four arrow keys translate the entire arbitrary line.

- Left arrow key moves the arbitrary line to the left.
- Right arrow key moves the arbitrary line to the right.
- Up arrow key moves the arbitrary line up.
- Down arrow key moves the arbitrary line down.