4. Well Correlation

The **Well Section Window** allows displaying well logs in a specified order, with the available logs and well tops.

4.1 Creating a New Well Section Window

To create a new well section window, follow the steps:

- Click the **Window** menu command and choose **New Well Section Window** as shown in Fig. 4.1
- An empty Well Section window is created as shown in Fig. 4.2

![Fig. 4.1: The New Well Section Window menu command](image)
4.2 Displaying Logs and Tops

To populate the window with well logs, expand the **Wells** folder in the **Project Explorer** window and choose the wells to be added to the section. For example, select the wells C6, C7, C1, C2, C3 and A10. Notice that whenever a well is clicked, it is directly sorted under the **Well Section** folder in the **Windows** tab of the **Process Diagram** window as shown in Fig. 4.3.

Now select the logs to be displayed for all wells from the **Global Well logs** folder under the **Wells** folder as show in Fig. 4.4.

Alternatively, well sections are created interactively by clicking them on a 3D window. As an exercise, let’s assume that we need to create a well section connecting the wells C6, C7, C1, C2, C3, and A10. Follow the steps:

- Create a New Well Section Window,
- Display all wells in a 3D window,
- Activate the **Well Correlation** process under the **Stratigraphic Modeling** in the **Process Diagram** window,
- Click **Add well to well section** icon on the **Well corr. 3D tools** toolbar,
- Now select the wells to be added to the well section. In this case, click the wells C6, C7, C1, C2, C3 and A10. See Fig. 4.5
Fig. 4.3: Some wells displayed in the Well Section window

Fig. 4.4: Well logs of well C1 displayed in the Well Section window
Fig. 4.5: Well section of the wells C6, C7, C1, C2, C3 and A10 displayed in a 3D window

- Display the Well Tops by toggling on the checkbox in front of the Well Tops folder as shown by Fig. 4.6.
- Note: If nothing is being displayed, then make sure that the well tops have been selected under "Sorted on Type".

Fig. 4.6: Well Tops displayed in the Well Section window
4.3 Scrolling and Zooming

The well log display can be scrolled or zoomed. Scrolling and/or zooming may be done for each log individually or synchronized for all logs. When scrolling and zooming, you will use the gray and white scroll bar on the left side of each well panel. The larger the white area as compared to the gray area, the larger is the displayed proportion of the well. When the entire bar is white, then the entire well is being displayed.

To scroll one single well: position the cursor over the white area in the scroll bar. A hand will appear. Press the left mouse button to scroll up and down as shown in Fig. 4.7. To zoom one single well: Position the cursor over the border between the white and gray area in the scroll bar. A double arrow will appear. Press the left mouse button over the white/gray border to zoom in/out as shown in Fig. 4.8.

Fig. 4.7: Scrolling the well up and down

Fig. 4.8: Zooming in and out
4.4 Grouping of Logs

Several logs can be grouped into a single panel; e.g. Neutron and Density logs may be grouped to distinguish between shale and non-shale intervals. To create a group panel, follow the steps:

- Make the Well Section active.
- Right click on the well name; e.g. well C4 under the well section.
- Choose Insert group panel.
- A group panel (Group 1) is created.
- Drag and drop the required logs into the Group icon; e.g. Porosity and Gamma logs as shown in Fig. 4.9.
- Expand the Group 1 icon to see the inserted log curves icons.
- The group panel and the selected log curves will now be visible in the Well Section window as shown in Fig. 4.10.

![Fig. 4.9: A group panel (Group 1) is created under the Well Section folder](image-url)
4.5 Flatten on a Horizon

To scroll all logs simultaneously, you need to flatten the logs to a horizon. To do this, follow the steps:

- Display the Well Section window.
- Display well tops in the well section window.
- Right click the Well Section in the Process Diagram window and select Settings from the drop down menu.
- When the Settings dialog box appears, select the Settings tab.
- Click Flatten on well top radio button, see Fig. 4.11.
- Under the Well scale synchronization, click Absolute (printed scale) radio button, see Fig. 4.11.
- Go to the Project Explorer window and select the well top to flatten all well logs to; e.g. select Top Tarbert.
- Go back to the Settings dialog box and click the blue arrow. The Top Tarbert will appear in the edit box as shown in Fig. 4.11.
- Click the Apply button; note that all logs will be flattened to the Top Tarbert horizon, as shown in Fig. 4.12.
Fig. 4.11: Settings for the Well Section window

Fig. 4.12: All logs flattened to the Top Tarbert horizon
4.6 Coloring of Logs

Color fill can be applied to areas between the panel edge and the log and/or between logs. For example, to fill color in the interval between two curves, follow the steps:

- Open the **Settings** of one of the curves in the group panel, say the porosity curve,
- Go to the 'Curve filling' tab as shown in Fig. 4.13. Make sure that there are no intervals defined in the pull-down list next to ‘Select interval’. If there are any intervals defined, then delete them by pressing the **Delete** button,
- Enter a new interval and specify the interval to be filled,
- Choose **max** or **min** from **Fill from curve towards** option,
- Select the **other curve** radio button for the **End fill at** option,
- Go to **Fill style** option and choose **Fill pattern** color and the **Fill color** that is desirable, and click the **Apply** button.
- The color and pattern change accordingly as shown in Fig. 4.14.

Fig. 4.13: Settings for 'Porosity' dialog box
Fig. 4.14: The area between log curves is filled with the specified color & pattern

Similarly, for panels containing one well log only, to color in the interval between the log and the left panel edge, follow the steps:

- Activate the well to be colored; say well C5,
- Select the Create/edit curve fill icon as shown in Fig. 4.15,
- Click in the area between the left edge and the Perm log to fill color in that interval as shown in Fig. 4.15.
4.7 Edit/Add Well Tops in Well Section Windows

Well Tops can be edited by positioning the cursor on one of the well tops. An arrow will appear (↑). When the arrow is showing, move the well top to the required position.

4.7.1 Edit Well Tops

To edit well tops in the well section window, follow the steps:

- Display the well whose well top is to be edited; in this case display well A16,
- Display Well Tops under Well Tops folder,
- Activate the Create/edit well tops [T] icon as shown in Well corr.2D tools toolbar below. When the mouse Hoovers on the well top, the double arrow (↑) appears,
- Click on Create/edit well tops [T] icon to move the well tops as shown in Fig. 4.16.
Fig. 4.16: Displaying existing Well Tops in a Well Section window

Fig. 4.17: Displaying existing Well Tops (flattened together) in a Well Section window
4.7.2 Add Well Tops

New Well Tops can be added in the well section.

To add a new well top, follow the steps:

- Click on the Add new well tops surface [S] icon as shown in Fig. 4.18. Note that the Create/Edit well tops icon must be active in order to get access to the Add new well tops icon,

Fig. 4.18: Inserting new Well Tops in a Well Section window

- Insert a new well top by clicking on the position where it should be inserted. Note that if one of your well tops in the Well Tops folder is active, the new well top will create as the same name as shown in Fig. 4.19,
To insert new well tops with a new name, make sure to de-activate the existing well tops as shown in Fig. 4.20,
4.8 Interactive Facies Interpretation

To edit an exiting facies log: Activate the Paint, Flood or Pick discrete log class icon. Select facies by right clicking the mouse. Start edit on the log.

To create a new discrete log:

- Click on the Paint discrete log, Pick up discrete log class, or Flood fill discrete log icon as shown in the Well corr. 2D tools toolbar below, The Create new discrete log icons will activate,
- Press on the Create new discrete log icon,
- A window will pop up in which you should specify the type of log to be created. In this case, choose fluvial facies as shown in Fig. 4.21, and
- Press OK. The new log will be placed under the Global Well Logs folder. See Fig. 4.22.

![Well corr. 2D tools toolbar]

![Paint discrete log class](A]

![Pick up discrete log class value](Shift+S]

![Flood fill discrete log class](F]

![Create new discrete log]

![Select Discrete Template]

**Fig. 4.21:** Creating a new discrete log
Fig. 4.22: Fluvial facies log is empty and placed under the Global Well Logs folder

Now spend sometime to display the logs that give information about the facies. Draw the different facies in the correct positions. See Fig. 4.23.
Fig. 4.23: The Fluvial facies log drawing process while the Settings for "Fluvial facies" dialog box is displayed